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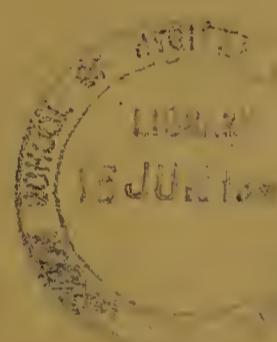
KEDAH AND PERLIS
ANNUAL REPORT

OF THE

MEDICAL DEPARTMENT

FOR

1937



BY

J. PORTELLY, M.D., D.P.H., D.T.M. & H.,

STATE SURGEON, KEDAH.

Alor Star:
PRINTED AT THE KEDAH GOVERNMENT PRESS.

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INTRODUCTION.

The following report is composed of two sections, one dealing with the work of the Kedah Medical Department, the second part being an account of the work performed by the corresponding department of the State of Perlis.

Kedah (area = 3,648 square miles; population = 474,800) and Perlis (area = 310 square miles; population = 52,700) are two Unfederated Malay States, entirely separate from each other politically, but bearing a close relation in other important respects, e.g. geographically, in composition of population and in similarity of main health problems. The analogy between the two States in these respects offers sufficient justification for a combined medical report; but a further reason is afforded by the fact that the Head of the Kedah Medical Department (State Surgeon) functions as the Official Supervisor of the Perlis Medical Department, the link drawing together the Medical Departments of the two States being thus strengthened. From the medical point of view Kedah and Perlis are very similar to each other; the difference between them is merely one of relative size and degree of development.

It is gratifying to note that the various elements of the Kedah "Scheme" adumbrated in the introduction to last year's report have been successfully put into effect. Obviously it is far too early to begin to search for benefits resulting from the introduction of the various measures outlined therein, especially in the case of the *kampong* midwife service. The four women who finished their training during the year, and who were actually posted to their *kampongs*, have an uphill fight not only in gaining the confidence of the people by overcoming the highly developed natural conservatism of the Malays, who look on any alteration of the old regime with grave suspicion, but also in combating the subterfuges of the old *bidans*, whose militant opposition to the coming of the Government midwife is a factor to be reckoned with. The *bidans*' objection is easily understood; the qualified midwife has come to oust her and deprive her of her "legitimate" trade. Preparation of the ground by propaganda, and the exceedingly helpful co-operation of District Officers and *Penghulus* have resulted in immediate success even beyond the most sanguine expectations. Four more midwives will be posted to *kampongs* during next year, and four new pupils will commence their training.

The reorganization of the Health Division has necessitated an increase in staff, the most important of which being an additional post of Assistant Health Officer, primarily intended for general health work in North Kedah, but concentrating his activities on laying the foundations of a regular School Medical Inspection Service, and starting a Venereal Diseases Clinic. The Government's provisional approval for the increase in staff has been granted.

The opening of the Dental Clinic has proved a perfect boon. It is sufficient to say that since the commencement of this service with improvised equipment in October, the Dentist's returns show the following figures:

				New cases.	Repetitions.
October	..	..	..	45	62
November	..	..	..	86	145
December	..	..	..	84	43

Success in the first steps of development of the Department has been a strong incentive towards elaborating further developments, the most important of which are the institution of a Tuberculosis Department at the General Hospital and the establishment of a Venereal Disease Clinic as a special branch of the Town Dispensary at Alor Star. The putting into effect during the next financial year of both of these departmental expansions, a short outline of which follows, has received the Government's approval.

An excellent opportunity is afforded by the very considerable experience in radiology and in diseases of the chest which one of the Assistant Medical Officers (Dr. Nayar) acquired in England. Modern methods of treatment of tuberculosis constituted the subject which he recently pursued during an intensive course of study at the Brompton Hospital. The main outline of the scheme is to have a special ward constructed, to obtain equipment and instruments for such measures as Artificial Pneumothorax, and to establish an out-patient clinic. This service has in effect already been successfully started on a small scale, and there is every reason to expect continuation of this initial success when the scheme is fully developed.

Dr. F. J. Bentley's publication on Artificial Pnemothorax (Medical Research Council—Special Report No. 215) has proved a veritable mine of useful information which is expected to save Kedah a good deal of preliminary experimentation which would have had to be undertaken in starting this sort of service on a large scale in a country like Malaya.

The establishment of a Venereal Disease Clinic, with its special sessions separate in time and place from the general clinic, is considered to be a very desirable and useful adjunct. A spare room in the new Town Dispensary, very suitably situated for privacy, will be furnished and equipped for out-door treatment of male patients. If the initial stages of the scheme at Alor Star warrant it, extension of the service to Sungai Patani and Kulim may be contemplated later on.

Further considerable extension of the chain of *kampong* dispensaries is assured; very shortly the whole of the rice growing population of North Kedah will be very efficiently served by a complete system of such dispensaries; the remoter centres of Central and South Kedah are also receiving attention.

By adopting the Straits Settlements and Federated Malay States syllabus of training and rules of examination of dressers, the status of Kedah-trained dressers has been brought into line with that of the other important administrations, and the certificate of efficiency issued by Kedah is now entitled to the same recognition as that accorded to certificates issued by the other Malayan administrations. This may not be of vital importance to Government dressers, but it is to those employed by estates. In any case a considerable rise in the standard of training, making for increased efficiency, is the immediate result.

Kedah is maintaining one medical and one dental student at the Singapore College of Medicine, the former being a Kedah born and educated girl, who, it is hoped, will join the Kedah Medical Service as Lady Assistant Medical Officer on qualifying L.M.S. (Singapore). One of the Dressers, who has shown a special aptitude for Dispensing, is being sent to the College to join the Pharmacy course. One Health Inspector was sent to Singapore to attend the course for the Diploma of the Royal Sanitary Institute.

With regard to Perlis two land marks in advancement may be mentioned, namely: (a) the introduction of the *kampong* Midwifery Service as in Kedah (one midwife was trained at Alor Star and duly posted to her *kampong* in Perlis: another pupil midwife was taken on for training: Perlis cannot manage the training of more than one midwife at a time) and, (b) the creation of the nucleus of a Public Health Service: a whole-time Assistant Health Officer is employed; he underwent a course of intensive training under the Senior Health Officer, Kedah, with a view to rendering himself familiar with local problems, especially in respect of Malaria and its control, Sanitary Board work, Estate inspection, school inspection, rural hygiene and registration of births and deaths. This last subject is of special importance in this case, as registration of births and deaths, now carried out by the Police Department, will eventually be handed over to the Medical Department, and the Assistant Health Officer will be responsible for the proper performance of this service.

Important decisions have been made with regard to the policy to be followed in dealing with the leprosy problem; reference to Appendix B on page 40 renders details available.

In the field of Health Propaganda the printing of appropriate posters and the acquisition of films and a projector may be mentioned.

The year under review may be said to have been comparatively healthy in general, though an outbreak of measles resulted in a considerable rise in the infantile mortality rate on Estates. The infantile mortality rate for the whole State, however, was lower than last year, namely 138 as against 145 for 1936. The general death rate was also reduced, the crude rate for the year under review being 20.6 as compared with 23.0 in 1936. Of the major communicable diseases, no cholera or plague was reported, the absence of the former, in spite of the epidemic which occurred in the neighbouring Kingdom of Siam, being a noticeable feature. A small outbreak of small-pox occurred which was rapidly controlled. Details of the outbreak are recorded on page 6.

No increase of malaria was recorded throughout the State, whilst in the protected areas a considerable reduction in the number of fresh cases was observed.

The water supplies of the State continued to receive attention. Many areas are still without adequate supplies, but, owing to the distance in many places of suitable sources, some time must elapse before proper supplies will be possible.

Urban areas continued to receive attention during the year. With the removal of the Senior Health Officer to Alor Star and the appointment of an Assistant Health Officer to Kulim, it has been possible to devote more attention to Sanitary Board work in these areas.

Proposal for Sewage Schemes were considered for all these towns and it is hoped that a start will be made during 1938 or 1939 with Alor Star. In view of the unlikelihood of a water carriage system being carried out at any time in Alor Star with a central treatment depot, a modification of the system was considered and it is proposed to introduce a series of Imhoff tanks which will discharge the effluent into the river after chlorination.

The general health in Perlis may likewise be reported as good. The death rate was 18.31 as against 19.61 in 1936, and the infantile mortality rate dropped to 105.41 from 116.64 for the previous year. The sharp outbreak of Cerebrospinal Meningitis reported on page 44 caused a situation alarming both to the authorities and to the local inhabitants, a state of panic amongst whom was only averted by the invaluable assistance rendered by the British Adviser, Mr. C. W. Dawson, who mustered the male population of the village, and, by explaining the position and exhorting them to follow the advice of the medical officials, rendered rapid control possible by the institution of regular and frequent "mass" gargling parades, and by minimising the vehement opposition to removal of cases to hospital.

Appendices on sundry matters, which may prove of interest to some, will be found on pages 35, 40 and 41.

REPORT OF THE MEDICAL DEPARTMENT, KEDAH.

FOR THE YEAR 1937.

For the purpose of departmental administration the State is divided into four districts viz. North, Central, South and the Island of Langkawi with the adjoining islands.

North Kedah has an area of 1,549 square miles with an approximate population of 244,000;

Central Kedah has an area of 1,546 square miles with an approximate population of 130,500;

South Kedah has an area of 553 square miles with an approximate population of 87,500;

Langkawi and the adjoining islands have an area of 59 square miles with an approximate population of 12,500.

I. ADMINISTRATION.

(a) STAFF.

(i) The Principal appointments are:—

The State Surgeon (Head of the Medical Department).
The Senior Health Officer (and State Registrar of Births and Deaths).
1 Health Officer.
2 Assistant Health Officers.
2 Medical Officers.
6 Assistant Medical Officers.
1 Lady Medical Officer.
1 Pathologist.
1 Assistant Pathologist.
1 Assistant Dental Officer.
3 Nursing Sisters.
5 Nurses.
56 Dressers.
4 Laboratory Assistants.
1 Dispenser-Storekeeper.
8 Midwives.
4 Vaccinators.
9 Health Inspectors attached to the Health Office.
11 Health Inspectors attached to the various Sanitary Boards.

(ii) Most of the above appointments were held as stated hereunder:

Dr. J. Portelly (State Surgeon), Dr. S. J. Campbell (Medical Officer, North Kedah), Dr. M. P. O'Connor (Medical Officer, South Kedah), Dr. E. D. B. Wolfe (Health Officer, Central Kedah) and Dr. M. B. Osman (Pathologist), carried out the duties of their respective posts throughout the year, as did the following Assistant Medical Officers: Dr. P. T. K. Nayar, Dr. M. R. Bhandari, Dr. Tan Joo Cheng, Dr. Low Chin Seang and Dr. J. M. Daniel.

Dr. W. J. Vickers acted as Senior Health Officer till October 23rd when he proceeded on leave.

Dr. R. E. Gross assumed duty as acting Senior Health Officer on November 24th.

Dr. Mabel G. Brodie returned from leave on November 12th thus relieving Dr. Margaret E. Hopkins who had been acting for her as Lady Medical Officer, Alor Star.

Dr. S. M. Kumaraswamy, Assistant Medical Officer, proceeded on leave on October 23rd, and Dr. V. G. Partwardhan, Assistant Pathologist on August 28th.

Dr. S. K. Kelkar, Assistant Medical Officer, returned from study leave in England on October 22nd; he specialized in Midwifery.

Dr. C. Sinnadurai assumed duty as temporary Assistant Medical Officer on June 11th.

Mr. B. R. O. Willis, L.D.S., Singapore, was appointed Assistant Dental Officer on October 7th.

Nursing Sister H. V. Fisher was transferred from Kedah on July 12th; she was relieved by Nursing Sister D. E. Allen.

Nursing Sister E. M. Smith was transferred from Kedah on November 18th and she was relieved by Nursing Sister J. Steele.

(b) LEGISLATION.

Legislation bearing on subjects with which the Medical Department is directly or indirectly concerned was passed as indicated in the following notes:

1. (a) Poisons (Amendment) Enactment, 1355, tightening the provisions dealing with storing or selling of scheduled poisons, and prescribing a form of licence to store poisons;

(b) amendment of Rules under the Poisons Enactment with a view to limiting the age of dealers in poisons, and prescribing a form of "Sale of Poisons Register";

2. Health Board Enactment—several amendments to schedules of schemes;

3. Land Enactment—several notifications under Section 19 establishing burial ground reserves;

4. several orders concerning prohibition of importation of animals in accordance with the Quarantine and Prevention of Diseases (Animals) Enactment;

5. establishment of new Controlled Building Areas by several notifications under the Sanitary Boards Enactment;

6. (a) Deleterious Drugs (Amendment) Enactment, 1355, bringing local legislation more closely into line with International Convention requirements;

(b) a further amending Enactment, No. 14 of 1356, deals with the legal provision concerning dentists;

7. (a) notifications under Section 4 of the Quarantine and Prevention of Disease Enactment, imposing certain quarantine restrictions against Siam on account of cholera;

(b) similar notifications under Section 13 of the Customs Enactment to control importation of fresh fruit and vegetables from Siam;

8. Chandu Enactment No. 8 of 1356, repealing and re-enacting Enactment No. 16;

9. several notifications under the Labour Code;

10. several notifications under the Workmen's Compensation Enactment;

11. declarations under the Air Navigation Enactment;

12. Midwives Enactment No. 1 of 1356, a new enactment to control the practice of midwifery in certain defined areas mainly by establishing a system of registration and organized supervision;

13. Registration of Dentists Enactment No. 6 of 1356, a new enactment establishing official registration of dentists with the object of controlling the practice of dentistry by private individuals.

The Midwives and the Dentists enactments constitute steps of the greatest importance, and their introduction will doubtlessly result in the removal of definite causes of ill health which are of considerable magnitude.

(c) FINANCIAL.

No detailed analysis of figures is called for in a report of this nature, but the following statements may not be irrelevant.

The revenue collected by the Department, consisting mainly of hospital fees, sale of medicines, drugs licences, fees for registration of dentists, certificates of birth or death and fees for laboratory work, amounted to \$16,384 as compared with \$14,690 collected during 1936.

The total expenditure amounted to \$551,225 (cf \$430,617 during 1936), this figure being made up of \$290,915 for Personal Emoluments and \$260,310 for Other Charges.

The expenditure figures do not include erection or upkeep of buildings and supply of furniture to staff, such expenditure being shown under Public Works headings.

(d) MEDICAL INSTITUTIONS.

NORTH KEDAH.

General Hospital, Alor Star	..	..	..	300 beds.
Out-door Dispensary and Clinic, Alor Star Town.				
„ „ Jitra.				
„ „ Changloon.				
„ „ Kuala Nerang.				
„ „ Yen.				

CENTRAL KEDAH.

District Hospital, Sungai Patani	..	..	..	300 beds.
„ „ Baling	..	..	..	35 „
Out-door Dispensary, Sik.				

SOUTH KEDAH.

District Hospital, Kulim	..	..	..	210 beds.
Out-door Dispensary, Bandar Bahru.				

LANGKAWI.

District Hospital, Kuah	..	..	..	70 beds.
Out-door Dispensary, Padang Masirat.				

Each of the hospitals mentioned has a regular out-door clinic in addition.

North, Central and South Districts are provided with an extensive motor travelling dispensary service by which regular visits are made to villages, schools and Police Stations wherever they are accessible by road.

In Langkawi Island an Assistant Medical Officer or a Dresser visits all villages regularly by sea or by road distributing medicines, vaccinating, giving injections and inspecting schools.

The above hospitals, providing a normal total bed accommodation of 915, cater solely for the needs of the general public and, of course, Government Officials; the medical requirements of the large labour forces on rubber estates are met by the Health Board organization which controls the various groups, each running its own medical affairs more or less independently, but having to comply with the requirements of the

Labour Code, the fulfilment of the provisions of which is supervised and, if necessary, enforced by the Government Health Department. The Health Board groups maintain the following hospitals:

1. Serdang Group	..	..	..	..	..	87	beds.
2. Dublin Estate	..	..	..	..	..	158	"
3. Bukit Mertajam Estate	..	..	..	..	..	70	"
4. Padang Serai Group	..	..	..	..	..	110	"
5. Kuala Ketil Group	..	..	..	..	..	90	"
6. Sungai Ular Estate	..	..	..	..	..	20	"
7. Badenoch Estate	..	..	..	..	..	36	"
8. Harvard Estate	..	..	..	..	..	66	"
9. Sungai Patani Group	..	..	..	..	..	150	"
10. Bedong Group	..	..	..	..	..	216	"
11. Sungai Tawar Estate	..	..	..	..	..	25	"
12. Scarborough Estate	..	..	..	..	..	35	"
<hr/>							
							TOTAL .. 1,063 beds.
<hr/>							

The total organised hospital accommodation of the State may, therefore, be quoted as:

State Government Hospitals	..	..	..	..	..	915	beds.
Health Board Hospitals	..	..	..	..	..	1,063	"
						TOTAL .. 1,978 beds.	

Each out-door dispensary has a few emergency beds in a small room set apart for the purpose, but these are seldom, if ever, used.

Although a certain amount of preventive work is carried out by all the above institutions as and when the occasion arises, they are essentially "curative" units; the following are solely "preventive" units maintained by Government:

1. Central Health Office and Registry at Alor Star, comprising the offices of the Senior Health Officer, an Assistant Health Officer, Health Inspectors, Clerical Staff, Central Registry of Births and Deaths, a mosquito research laboratory and a Health Propaganda Museum;
2. the office of the Health Officer, Central Kedah, at Sungai Patani;
3. the office of the Assistant Health Officer, South Kedah, at Kulim.

Mention may also be made of the Central Pathological Laboratory at which all serological, bacteriological, and histological examinations are carried out. It is situated at Sungai Patani for convenience, this town being the most central. This laboratory carries out tests not only for Government institutions, but also as requested by the Estate Group Hospitals.

(e) BUILDINGS.

The matter dealt with under this heading is intended to convey information concerning new buildings. The list of new buildings would have been considerably longer had the programme approved for the year been carried out, but several unforeseen causes of delay arose which interfered with the actual completion of all the buildings. As practically everything was well advanced in course of construction at the end of the year, new buildings for 1937 may be stated to have been as follow:

1. Building for Radiology Department, General Hospital, Alor Star.
2. Building for Dental Clinic, General Hospital, Alor Star.
3. Laundry Shed, General Hospital, Alor Star.
4. Attendants' quarters, General Hospital, Alor Star.

5. Quarters for Assistant Dental Officer, Alor Star.
6. Ten quarters for Health and Clerical Staffs at Alor Star.
7. New Dispensary and quarters for Staff at Jitra.
8. New Dispensary and quarters for Staff at Kuala Nerang.
9. New Dispensary and quarters for Staff at Bandar Bahru.
10. Quarters for Assistant Medical Officer, Langkawi.
11. One ward and various additions, Langkawi hospital.
12. Laundry Shed at Sungai Patani hospital.
13. Mortuary Shed at Sungai Patani hospital.
14. Various additions, Sungai Patani hospital.
15. New 2nd Class Ward Kulim hospital.
16. Office and quarters for new Kulim Health Unit.

The usual upkeep of all buildings has been satisfactorily attended to by the Public Works Department.

II. VITAL STATISTICS.

The "Balancing Equation" Method of population calculation (Census and Births — Deaths and Migration surplus) has been used since 1935.

Year	Population		BIRTHS		DEATHS	
	Mid-Year		No.	Rate per mille	No.	Rate per mille
1931 (Census year)	433,100	15,615	30.05	9,129
1935	452,554	16,713	36.93	10,299
1936	463,904	18,638	39.50	10,683
1937	474,795	17,664	37.20	9,781

Detailed Statistics for the year 1937 will be found listed on page 21.

(a) Population.

The year's population figure of 474,795 shows a steady increase which is slightly less than the increase for the previous year, but which indicates the steady improvement in economic conditions. This is borne out by the increase of the labour population on estates amounting to over 10,000.

The ratio of races is still fairly constant, Malays comprising 67%, Chinese some 18%, and Indians 12% of the total, compared with last year's figures of Malays 70%, Chinese 18%, Indians 11%.

The main population in towns and villages, with the exception of Alor Star, continues to be Chinese, whilst Malays continue to form the majority of the rural population.

(b) Migration.

The immigrational surplus during the year 1937 amounted to 2,988, compared with the figure of 3,385 for 1936. The surplus is composed almost entirely of Indians.

(c) Births.

The number of births registered in the State during the year was equal to a crude birth rate of 37.2, a decrease of 2.3 per mille on last year's figures. There seems to be no obvious reason for the decrease, as the general death rate for the country has improved and there was no epidemic of disease such as would affect the birth rate. Of the births registered during 1937, 8,655 were of females and 9,009 of males, compared with 8,982 female births and 9,386 male births during 1936. The male births again exceeded the female for the three principal races. There was a considerable alteration in the proportion of births registered by Malays, Chinese, and Indians. Whereas in 1936 the Malays registered 4 births to each Chinese birth and 7 births to each Indian birth, in 1937 it dropped to 3:1 for Chinese and 5:1 for Indians. The proportion between Chinese and Indians remained practically the same. There has been a reduction in the total number of Malay births which is greater than the reduction for the total births for all races (vide Table III, page 22).

Still births were again by far most marked amongst the Malays (74% of the total recorded as compared with 76% in 1936).

(d) *Deaths.*

9,781 deaths were registered during the year giving a crude rate of 20.6, the lowest recorded since the introduction of the Balancing Equation method of estimating population, and lower than the 1931 (Census year) figure. A study of the figures for the most stable section of the population, the Malay, during this period shows the considerable drop of 3.7 per mille for the year. This is the best indication of improved health conditions, as the population figures for the rest of the population are more liable to error. The drop in the death rate, however, may be partly explained by the reduced birth and infantile mortality rates.

The male deaths predominate up to the age of 15 years. For the age periods 15 to 30 years female deaths predominate, that is roughly during the productive period. After thirty, male deaths again predominate.

The following diseases among persons of all ages in order of frequency constitute the principal cause of mortality.

Disease	Approximate percentage of Crude Deaths		
	1937	1936	1935
Fever unspecified	36	36	42
Malaria	6	12	4
Premature Birth	11	10	12
Convulsion	9	10	10
Old Age	9	10	9
Respiratory diseases (excluding T. B.)	4	6	7
Bowel diseases	4	3	2

(e) *Infantile Mortality.*

The crude infantile mortality rate (number of deaths under 1 year of age per 1,000 live births) over the last six years was as follows:—

1932	..	..	..	..	..	..	120
1933	..	..	..	..	..	..	141
1934	..	..	..	..	..	..	148
1935	..	..	..	..	..	..	148
1936	..	..	..	..	..	..	145
1937	..	..	..	..	..	..	138

Since the 1932 figure which is the most favourable one, this year has been the best, but the rate is still disconcertingly high.

Reference to the mortality figures at different age periods will show that nearly 50% of infantile deaths occurred during the first month of life.

III. COMMUNICABLE DISEASES.

All cases of communicable disease reported to the Health Department were fully investigated and all necessary action taken to prevent spread. Of the major communicable diseases no case of cholera or plague was reported, but 15 cases of small-pox occurred.

Small-pox.

15 cases occurred in South Kedah during the year. Four of these were fatal.

The first case was that of a Chinese woman who had recently arrived from China. She was admitted to hospital on the 4th day after arrival. The connection between this case and the other cases, which occurred amongst Malays in a rubber estate some miles from Kulim, was not clearly established, but there can be no suspicion of multiple foci. The first case was discovered on June 28th and the last on July 24th. The outbreak was, therefore, comparatively quickly suppressed.

A special vaccination campaign was instituted and some 27,400 persons were vaccinated as a result of this outbreak. The manager of a rubber estate was prosecuted for failing to report a case amongst his coolies; he was fined \$100.

Cholera.

No case has occurred for some ten years, but the epidemic which occurred in Siam within striking distance of the Kedah boundaries caused considerable anxiety, and necessitated the institution of measures involving inspection of passengers by rail and road, and prohibition of importation of all raw fruit and vegetables from Siam.

The numbers of railway passengers subjected to routine inspection were as follow:

Class		1934	1935	1936	1937
1st class	...	1,186	1,299	1,127	1,436
2nd class	...	1,179	1,675	1,432	1,408
3rd class	...	7,977	10,859	10,194	9,912
	TOTAL	10,342	13,342	12,753	12,756

Plague.

No cases of this disease has ever been notified and no anti-plague measures appear ever to have been enforced. That rats can be found in abundance in the centres of population can be ascertained at any visit. Efforts were made to clear up food and storage premises within Sanitary Board areas, and to improve refuse collection and disposal.

Measles.

During the year there was a prolonged epidemic of measles. The disease occurred chiefly on estates amongst Indian labourers, having been introduced from India by new arrivals. The epidemic in its early stages was characterised by a high incidence of secondary broncho-pneumonia. Some 1,443 cases were notified with 26 deaths, but it is certain that a considerably larger number of deaths from broncho-pneumonia occurred which should have been assigned to measles. Deaths from pneumonia increased from 207 to 291 and the increase was mainly among Indians.

The following table indicates the incidence of reported communicable disease by nationality for the years 1936 and 1937.

Malaria.

Diagnosed malaria accounted for 580 deaths or 5.9% of deaths from all causes as compared with 12% in 1936, while 4,074 or 42% of the total deaths recorded were reported as due to malaria and fevers of undefined origin (46% in 1936).

No epidemic of malaria is to be recorded, though there was a rise on some European Estates due to the felling of old rubber trees for replanting schemes.

Apart from Estates—dealt with below—the three largest towns continued to be controlled in part, while drug prophylaxis was continued in certain small populations in dangerous areas.

Expenditure during the last five years has been as follows:

	Labour, material etc.	Oiling and labour for oiling.
1933	6,099 3,363
1934	6,966 3,458
1935	8,000 4,196
1936	8,800 3,800
1937	9,800 2,800

Late in 1935 a half mile protective zone round these towns was included. A great rise in costs of oiling was expected, but with more efficient efforts the actual expenditure was greatly reduced.

The activities of the anti-malarial section can be classified under three headings:—

1. Control of dangerous mosquitoes.
2. Control by drug prophylaxis.
3. Consultation.

Under (1) the towns of Alor Star, Sungei Patani and Kulim, the villages of Bedong, Kuala Nerang and Serdang on the mainland, and the village of Kuah on the island of Langkawi were the areas where measures against dangerous mosquitoes were carried out.

In the three towns the work was regularly checked by weekly larval surveys and nightly adult catches in the human bait trap and outside, and by dissection. All reported cases were investigated with a view to finding out whether they were primary or relapse cases, and immediate action was taken on all primary infections to locate the source.

Alor Star would be a serious problem should, at any time, *Anopheles barbirostris*, which is a common breeder at a certain time of the year (notably October to January), develop pernicious habits as it has done on occasions elsewhere in the country. Its control would be practically impossible without seriously interfering with paddy plantation or introducing expensive irrigation schemes. It is unlikely that spraying with Paris green would be particularly effective, as during the period of greatest development of this anopheles the rice is thick and high. At present malaria is undoubtedly mildly endemic in the neighbourhood with a peak during October to January.

Sungei Patani offers a somewhat different problem. It is mainly fairly high undulating country with *Anopheles maculatus* as the potential carrier. There is in addition a large rice field area within a $\frac{1}{4}$ mile of the residential area which offers the same problem as the Alor Star paddy fields.

Whilst there are very few primary cases reported in the town, there are a considerable number of infected people coming in from outside, very many of them being labourers from estates spending a few nights in the town; there is thus a constant focus of infection available should mosquito control measures break down.

Kulim is situated in the most dangerous area of all, and during the year considerable attention was devoted to the town. A survey of a *kampong* area in the town showed a spleen rate of 22% and a parasite rate of 10%. Drains have been dug on all ravine sides and are carefully oiled. Subsoil drainage work has been carried out at portions of Tebuan Valley, Rifle Range, Bukit Awi and the Posts and Telegraphs cooly lines area. As a result primary cases arising in the town are few, though many cases are constantly coming in from the surrounding country.

An epidemic was narrowly avoided when an estate within the area cut down large numbers of rubber trees for re-planting. Considerable breeding started in the holes left when the roots were extracted.

Chemio-prophylaxis.—Several small centres where anti larval measures are impracticable were controlled by either quinine or atebrin, the same procedure as laid down in the previous year being carried on.

Mosquito dissections to the number of 10,441 were carried out during the year under review and 687 blood examinations were done.

A species, new to Malaya, namely *Anopheles ramsayi*, was found in a pond covered with *Pistia Statioites* just outside Alor Star. It appears to have a seasonal prevalence, as the species became very rare by the end of December.

With regard to Malaria on estates 13,164 cases (of malaria and unspecified fever) were reported in 1937 as compared with 10,377 in 1936. Table X on page 25 sums up the Malaria Statistics on Estates for the current year.

On European holdings the case incidence per mille rose from 264.6 in 1936 to 286, while the malaria death rate fell from 2.5 to 1.2. The hospital admission rate for all fever cases rose from 55.7 to 58.4. 5.7 of the total deaths were caused by malaria. Case fatality for hospital cases was 0.7% compared to 1.6% in 1936 while the lines fatality rate fell from 0.1 to 0.04%. On the whole the health conditions are much more satisfactory than those of the previous year.

As regards Asiatic holdings the population increased by 3,342 during the year under review. Hospital admissions increased from 381 in 1936 to 393, but the total number of cases notified dropped from 851 to 619 in marked contrast to European estates where there was a considerable rise. The case incidence dropped from 79 to 47. It is impossible to consider these figures as of any value whatever for statistical purposes.

IV. SANITARY BOARDS, RURAL AREAS, ETC.

(A) SANITARY BOARDS.

(i) General.

There are nine districts in the State (including one in Langkawi island) which have been gazetted as Sanitary Board areas. These cover the main population centres.

The general conditions prevailing are still unsatisfactory, though much has been done, and is being done, to improve conditions. The difficulties involved are considerable and are due to the fact that the legislation is no longer suitable for present conditions. Still closer co-operation between the District Officers and Health Department is desirable, and new bye-laws are very much needed to assist.

(ii) Sewage Disposal.

Little has been done to improve the method of sewage disposal which still remains a dangerous feature of the towns in Kedah. Hand carriage after removal still remains, and as a consequence a considerable quantity of nightsoil finds its way into the drains and streams. Supervision has improved, but it is impossible to supervise adequately with the present methods.

The scheme submitted last year for sewage disposal has been reconsidered, and it is now proposed to construct a series of tanks which will serve groups of houses. The buckets will be emptied and washed by means of a hopper into these tanks. The effluent from the tanks will be adequately chlorinated and will then discharge into the river.

During the year the nightsoil trenching ground behind the hospital in Alor Star was closed, and the nightsoil is now removed for burial to a trenching ground down the river. It is hoped in the coming year (1) to discontinue using the last named trenching ground and to substitute dumping at sea, and, (2) to make a start with a sewage scheme in Alor Star by constructing one tank for special observation.

(iii) Refuse Disposal.

Of the larger towns Sungei Patani has a modern incinerator, one is under construction in Alor Star, and it is proposed to replace the existing unsatisfactory one in Kulim in the coming year. Many of the smaller villages have small incinerators which are adequate for their needs.

"Controlled tipping" in Alor Star is being continued till the new incinerator is ready, but it is not particularly successful owing to the nature of the soil.

House to house removal of rubbish has continued, and each house is now supplied with its own bin. The provision of public dustbins in shophouse areas has proved unnecessary, and it is proposed to discontinue their use in the near future. At present they are an obstruction to the streets, and a source of nuisance, as they are frequently misused.

(iv) *Water supplies.*

Considerable attention was devoted to the improvement of water supplies during the year. Progress is necessarily slow as schemes require careful working out before action can be taken. The provision of filtered and chlorinated supplies to all the big towns should be possible in the near future. Analysis of present supplies can only be described as highly unsatisfactory, and the absence of any epidemic traced to such supplies is no promise that the future will be as happy. Schemes are also under consideration for an extension of supplies to rural dwellers. Such schemes must necessarily be expensive and slow in development, but the serious attention that is being devoted to them promises profitable results in the not too far distant future.

(v) *Drainage.*

The present position of drainage is unsatisfactory, depending as it does so much on earth drains. Some improvement was recorded during the year, but a defined programme over a number of years is indicated to insure the necessary work being carried out.

(vi) *Housing and Town Planning.*

The good work carried out during the previous year was continued, and layouts for the larger towns and some of the smaller ones have been prepared.

Back lanes are being constructed, and this in many cases meant the acquisition of property.

Considerable demolition of old and insanitary houses was carried out during the year, and a large number of such houses are under notice to demolish in the future. Adequate time to the owners is given in all cases where the actual danger of collapse is not imminent.

(vii) *Food in relation to Health and Disease.*

(1) *Markets.*

Improvements and additions were carried out in certain smaller markets, whilst those in larger towns received considerable attention.

Provision for a new general market in Alor Star has been made; a special pork market for the needs of the local Chinese is urgently needed.

An improved type stall has been designed for use in all markets. No refrigeration in any market has yet been provided in Kedah; it is hoped that this defect will be remedied in the new market.

(2) *Slaughter Houses.*

The present slaughter houses, though much improved, are still unsatisfactory. Provision for new slaughter houses in the large towns has been approved and they will be constructed in the coming year.

(3) *Restaurants and Eating Shops.*

All these were subject to examination and licensing, and a very considerable improvement resulted. Temporary shops for this purpose were eliminated as far as possible as it is almost impracticable to keep such premises continually sanitary.

(4) *Street Stalls and Hawkers.*

Street stalls caused the usual trouble in control, and, whilst action was taken to remove the most unsatisfactory, it can never be accepted that any of them will at any time be satisfactory. They compete unfavourably with eating shops; their very nature makes it impossible for them to comply with the hygienic conditions called for in the production and handling of food; their structures on roadside and vacant land are a hindrance to improvement in the appearance of the towns, and they are frequently a source of obstruction to both pedestrian and vehicular traffic.

Their entire elimination should be the ultimate object. No hardship need be involved on individuals carrying on such a trade, as, with a little combination, a number of holders of such stalls could quite easily open suitable eating shops. At present the trade with its small overhead expenses is too lucrative for such voluntary action, and continuous pressure will be needed to induce stall holders to open shops.

Hawkers offer an even greater problem, and a gradual elimination of them is desired. Restriction to the sale of fruit and vegetables should be the first step.

(5) *Unlicensed Food Premises.*

As no legislation yet exists to control such manufacturing premises as aerated water works and ice factories, little can be done. Legislative control is now being sought.

(6) *Bakeries.*

More stringent regulations to control all bakeries were enforced. Provision for new type premises in Alor Star has been approved, and premises will be constructed in the coming year.

(7) *Controlled Building Areas.*

Certain areas in the State have been gazetted so that future building can be controlled. An attempt is now being made to extend these areas by suitable legislation to cover some 300 feet on each side of all main roads in the State. This should prevent the present tendency to the erection of insanitary hovels along the main traffic routes.

(B) RURAL AREAS.

Attention was paid particularly to those areas where malaria was endemic. Quininisation of some areas was carried out with satisfactory results. It is proposed to extend considerably activities in Kampong areas in the coming year by an attempt to improve, sanitation by education and advice.

(C) GOVERNMENT DEPARTMENTS.

Police stations and other Government quarters were inspected as circumstances and staff permitted. Sanitary improvements were indicated to the heads of the various departments concerned as required.

As a result of previous recommendations marked improvements were made in the housing of Government labourers at considerable expense. Inspection of all lines was continued throughout the year.

(D) BURIAL GROUNDS.

During the year, the sites of 18 burial grounds were inspected at the request of the Land Office.

V. INDUSTRIAL HYGIENE.

(a) RUBBER ESTATES.

The Kedah Health Board Scheme for estates continued to function smoothly.

There are 83 European and 462 Asiatic estates known to this Department; they are distributed as follows:—

(i) *European Owned.*

North Kedah ..	..	..	..	..	..	9
Central Kedah ..	..	..	..	..	..	40
South Kedah ..	..	..	..	..	..	34

(ii) *Asiatic Owned.*

North Kedah ..	..	..	..	..	..	26
Central Kedah ..	..	..	..	..	..	211
South Kedah ..	..	..	..	..	..	79

Of these all European estates were visited at least once during the year.

Of the Asiatic estates 401 had at least one routine visit while the total visits including revisits to follow up the results of recommendations and orders amounted to 929. A large amount of extra work is entailed in supervising Asiatic estates owing to the obstruction of the majority of Asiatic estate owners and their failure to come forward and discuss the recommendations made.

In this respect the figures for revisits, orders issued and prosecution resulting therefrom, speak for themselves.

No. of Orders issued.	No. of Prosecutions.	No. of Convictions.
314	25	17

(iii) *Housing.*

56 estates erected new lines during the year and in addition 14 submitted plans, which were approved, for lines to be built during the coming year.

The type of lines usually built is of the ground type with a single row of rooms, each with its own enclosed kitchen. During the year this Department instituted the policy of refusing to approve plans for *kongsi* houses for Chinese labourers as it is considered, with the concurrence of the Protector of Chinese, that the Chinese labourer likes, and is entitled to, as much privacy as the Indian and Malay labourer.

(iv) *Water supplies.*

Four estates installed new piped water supplies during the year and new protected wells were constructed on several others. Mechanical filters and chlorinators were installed on 3 estates and one Group Hospital.

(v) *Sewage Disposal.*

10 estates have septic tanks latrines, some new sets on these estates having been constructed during the year. The majority of estates employ pit latrines, though a few still use the bucket type, usually owing to the height of the subsoil water making pit latrines undesirable.

Two estates have dumping cesspits into which the contents of the buckets are emptied instead of the usual trenching.

(vi) *Anti-malarial Work.*

Table IX (page 24) shows the incidence of malaria on estates.

The majority of estates where malaria exists carry out anti-malarial oiling weekly, and in many estates this is re-enforced by chemio-prophylaxis during the malaria season.

During the year chemio-prophylaxis was carried out with successful results on 8 small Asiatic estates which are highly malarious, but on which efficient oiling for a variety of reasons is considered impracticable. No new Health Board anti-malaria oiling schemes were instituted during the year.

Anxiety was caused during the year by the increased malaria incidence on certain estates due to the felling of old rubber trees for re-planting schemes, the outbreaks being due in some part to the failure of managers to realise the danger involved and to take extra precautions to combat the increased malaria risk. On the whole anti-malaria work was maintained at a reasonably high standard.

(vii) *Group Hospitals.*

All the group hospitals (vide page 4) were visited during the year. Recommendations were made for the alleviation of over-crowding which was noticeable during an epidemic of measles.

As a result of these recommendations, extra ward accommodation has been provided.

(viii) *Infectious Diseases.*

Many estates were seriously affected by a severe epidemic of measles characterised by a high incidence of secondary broncho-pneumonia and a high mortality rate. The epidemic appears to have been started by new coolies arriving from India, and was confined almost entirely to the Indian labour force.

1,371 cases with 22 deaths were notified from estates and 172 with 4 deaths from Government Hospitals. This number of deaths does not include a number from broncho-pneumonia. Measles cases are tabulated on page 33 (Table XIX).

(ix) *Care of the sick.*

All deaths occurring in the lines, and all those occurring in hospitals in which there appeared to be delay in admission, were investigated as in previous years.

(b) **MILLS AND MINES.**

21 Sago and Rice Mills were inspected during the year in pursuance of the policy of demanding a reasonable standard of housing and sanitation of these places.

All quarries worked by the contractors to Government were inspected during the year, 47 visits being paid to 22 quarries.

Contractors were induced to provide new lines for housing their labourers only with difficulty. In view of the insecurity of tenure of the contracts and the temporary nature of the work, a cheap modified design of line was adopted.

(c) **VITAL STATISTICS.**

Tables XIII A and B, XIV A, B, C and D, XV A, B, C and D, XVI, XVII, XVIII, XIX, XX and XXI (pages 26 to 34) show the vital statistics for rubber estates.

There was a marked increase in estate population both on European and Asiatic estates. The former shows an increase of 7,826, and the latter shows an increase of 2,342, over the populations for 1936. In spite of this increase in population the death rate showed an increase of only 1.1 per mille over 1936.

Figures for Asiatic estates are known to be inaccurate; taking the figures for European estates, the death rate for Indian labourers fell from 9.1 in 1936 to 8.6 in 1937. On European estates the infantile mortality rate rose from 193 per mille in 1936 to 255 in 1937.

The greatest increase is found amongst Indians and is accounted for to a great extend by the measles epidemic. A big increase in the infantile mortality rate was also noted on Asiatic estates, the figures being 273.8 in 1937 as compared with 199 in 1936.

Apart from the measles epidemic, however, the infant mortality rate is still very high and is a strong indication of the necessity for more efforts towards infant welfare on estates. This question was considered by the Health Board which has asked for, and received, memoranda on the subject from the estates Visiting Medical Officers.

(d) **MALARIA.**

Malaria statistics show an increased incidence rate, namely 231.3 per mille, the rate for 1936 being 222.1. This may be due in some measure to the increase of malaria accompanying replanting on some of the bigger estates, as no corresponding increase is noted in the towns controlled by the Health Department, and on Asiatic estates the rate has dropped from 79 to 47 per mille.

VI. SCHOOLS.

During the year all Malay Vernacular Schools not visited during 1936 were inspected, and brief talks were given to the children on health matters after each inspection. Tables XI and XII (page 25) show the result of these inspections. The Health Officer paid visits to certain schools with regard to the sites for new buildings and wells. The sanitary state of Malay Schools is summarised briefly hereunder:

	Piped supply	Protected wells	Earth wells	Rain water	River water	None	Total
Re Water supply	...	16	16	2	4	Nil	1

	Bucket	Trench or pit	Mound	Surface	None	Total
Re Latrines	...	16	12	9	Nil	2

Recommendations were made for 2 protected wells, 10 latrines (pit), 4 mound latrines, seven latrines to be provided with concrete squatting platforms and remedying of various minor defects.

3 Chinese Schools were visited and fully inspected at the request of the Registrar of Schools and many others were inspected with regard to their suitability as schools. Chinese schools, however, are not subject to routine visits by this Department.

VII. MATERNITY AND CHILD WELFARE.

The position with regard to a "Welfare Service" as usually meant by that term remains practically unchanged in respect of the comments made upon it in last year's report, that is to say the stage of development reached does not yet warrant the establishment of an exclusive whole-time service of Health Visitors or of any activity exclusively advisory in nature. Strictly speaking this statement refers only to rural conditions which apply to the greater part of the State; the large labour population on estates offers a different welfare problem, reference to which has been made on page 13.

What was referred to as the "foundation" of any (rural) welfare service in last year's report, however, was well laid during the year under review: the Government-subsidised village midwife scheme has been successfully launched, and all signs augur extremely well for its future. The villagers have shown their appreciation in a practical way: under the direction of their respective *penghulus* they have decided to provide the midwife with free quarters at their expense, raising funds by collecting subscriptions amongst themselves.

Perhaps it is not superfluous to mention that these locally trained midwives, who may be regarded as the forerunners of welfare home visitors, have had the ante-natal "mind" well inculcated into them, and, as the "patients" seem to be collaborating very satisfactorily by calling them early instead of waiting for the onset of actual delivery, very effective ante-natal advice may be expected.

Another point which may be noted is that the nearest medical unit, which may be a Travelling Dispensary, has instructions not only to replenish the midwife's bag but to assist in every way; the supply of remedies for ailments not directly connected with pregnancy (and these incidental ailments are very frequent), has been instrumental in enhancing the attractions of the new system.

In addition to the institution of the above service a very important step was taken to improve midwifery, namely the introduction of the Midwives Enactment, which controls the practice of midwifery by the usual method of compulsory registration. So far the new law has been applied only to the three largest towns, *i.e.* Alor Star, Sungai Patani and Kulim, as these were the only places where a sufficient number of qualified and certificated midwives were available. It may be some time before the application of this enactment can be extended to other areas, but the effect of the encouragement to qualified midwives to distribute themselves in areas where their services are not only appreciated but fairly lucrative to themselves will be very attentively watched by the Department, and extension of the provisions of the law to fresh areas will be effected as soon as conditions warrant it.

At the end of the year, therefore, the situation in the matter of the practice of midwifery may be stated to be: (a), four Malay women have been trained and posted to work among Malays; these midwives are subsidised by Government; the extension of this service will be continued; there is every reason to hope that the slow but sure extermination of the untrained *bidan* is assured; and, (b) legislation has been introduced to control midwifery practice by private individuals by a system of registration; the town areas of Alor Star, Sungai Patani and Kulim have been placed under this law; the Health Department official of each of these towns is the local registrar; the private midwives registered are mostly Chinese (the town population is preponderatingly of the same nationality); most of these certificated midwives were trained at the Penang Maternity Hospital and are registrable under the Straits Settlements Ordinance.

The work of the Lady Medical Officer in the direction of maternity and child welfare, albeit performed indirectly, has again been of immense value. Her access to women and children is ensured through her work in the women's and children's wards and clinic at the General Hospital, Alor Star, the women's and children's clinics at all the out-door dispensaries of North Kedah and attending to professional calls (clinical or obstetrical) by the families of Government Officials.

The following figures give an indication of the Lady Medical Officer's activities during the year under review:

Women's and children's clinic—General Hospital—

1st visits	..	..	891
Revisits	..	..	761
Injections	..	..	2,107
" " " —Town Dispensary—			
1st visits	..	..	2,102
Revisits	..	..	3,209
" " " —Other dispensaries—			
Injections	..	..	294

("Injections" quoted above are intravenous arsenical injections given for Yaws.)

VIII. HOSPITALS AND DISPENSARIES.

A total of 19,531 patients were treated in all hospitals and prison sick wards. The deaths numbered 889 giving a percentage of 4.55%. 241 deaths occurred within 48 hours of admission; excluding these, the death rate was 3.31%.

The following table gives the number treated, with deaths, for the past six years:—

Year	No. treated	Deaths	Percentage of deaths
1931	12,695	748	5.81
1932	12,473	596	4.77
1933	13,617	646	4.74
1934	14,367	739	5.14
1935	18,401	799	4.34
1936	18,160	894	4.92
1937	19,531	889	4.55

The following table gives the number of cases treated at Out-Door Dispensaries, as well as number of cases treated by the Travelling Dispensaries:—

		New cases	Repetitions	Total
Out-door Clinic, Hospital, Alor Star	...	10,208	2,856	13,064
Out-door Dispensary, Alor Star Town	...	11,577	9,023	20,600
" " Changloon	...	3,994	578	4,572
" " Kuala Nerang	...	4,017	1,682	5,699
" " Yen	...	9,051	3,091	12,142
" " Jitra	...	2,862	275	3,137
" Clinic, Hospital, Sungai Patani	...	7,048	1,485	8,533
" Baling	...	3,548	1,042	4,590
" Dispensary, Sik	...	3,447	394	3,841
" Clinic, Hospital, Kulim	...	9,399	2,444	11,843
" Dispensary, Bandar Bahru	...	2,175	364	2,539
" Clinic, Hospital, Langkawi	...	3,230	501	3,731
" Dispensary, Padang Matsirat	...	770	46	816
Motor Travelling Dispensary, North Kedah	...	9,574	1,481	11,055
" " Central Kedah	...	5,995	154	6,149
" " South Kedah	...	4,370	1,103	5,473
Travelling Dispensary, Langkawi	...	854	...	854
Prison Hospital, Clinic, Alor Star	...	1,291	4,991	6,282
" " Sungai Patani	...	120	698	818
Total	...	93,530	32,208	125,738

The following table gives the number of cases treated during the year in the various Hospitals and Prison sick wards:—

Hospitals			No. treated	Deaths	Percentage of deaths
Alor Star	...	...	6,952	325	4.61
Sungei Patani	...	...	6,729	298	4.43
Kulim	...	...	4,876	230	4.72
Baling	...	...	347	13	3.72
Langkawi	...	...	498	23	4.62
PRISON SICK WARDS.					
Alor Star	...	...	129	...	...
Sungei Patani	...	...	...	...	...
Total	...	...	19,531	889	4.55

NATIONALITIES OF INDOOR PATIENTS.

Nationalities	No. treated	Deaths	Percentage of deaths
Europeans	23	...	...
Eurasians	9	1	12.12
Chinese	8,495	503	5.92
Indians	8,347	324	3.88
Javanese	22	4	18.18
Malays	2,407	49	2.04
Japanese	9	1	12.12
Others	219	7	3.19
Total	19,531	889	4.55

The approximate average daily number of indoor patients for the year 1937 was:—

Hospital, Alor Star ..	..	..	..	..	..	318.1
„ Langkawi	..	..	..	..	..	40.7
„ Sungei Patani	..	..	..	..	..	260.0
„ Baling	..	..	..	..	..	15.8
„ Kulim	..	..	..	..	..	158.4
Prison Sick Ward, Alor Star ..	..	..	..	..	..	0.3
„ Sungei Patani	..	..	..	..	..	Less than 1

The average daily number of indoor patients in Kedah Government Hospitals and Prison Sick Wards for the past 6 years was:—

1931	..	..	..	..	..	557.86
1932	..	..	..	..	..	548.10
1933	..	..	..	..	..	678.60
1934	..	..	..	..	..	673.10
1935	..	..	..	..	..	786.10
1936	..	..	..	..	..	835.4
1937	..	..	..	..	..	793.3

PREVAILING DISEASES TREATED IN HOSPITAL.

Diseases	1935			1936			1937		
	Cases	Deaths	Deaths %	Cases	Deaths	Deaths %	Cases	Deaths	Deaths %
Malaria ...	5,205	131	2.51	3,800	111	2.65	4,576	139	3.04
Dysentery ...	211	19	9.00	204	16	15.38	244	16	6.56
Venereal Diseases ...	390	1	2.56	339	...	...	245	...	...
Respiratory Diseases (ex. Pulm. Tuber.)	885	47	5.31	1,025	56	5.46	694	71	1.02
Pulmonary Tuberculosis ...	416	137	23.31	430	162	37.67	442	136	30.76
Ankylostomiasis ...	778	27	4.75	801	15	1.87	647	13	2.01
Ulcers ...	1,023	2	.19	1,156	1	.08	1,275	1	.08
Wounds & Injuries ...	1,689	15	.88	1,858	27	1.45	1,841	31	1.67
Other Diseases ...	7,780	418	5.37	8,547	506	5.92	9,567	482	5.04
Total ...	18,401	799	4.34	18,160	894	4.92	19,531	889	4.55

MENTAL DISEASES.

Kedah patients at the Central Mental Hospital, Tanjung Rambutan, 1937.

Sex		Remained	Admitted		Total	Discharged	Died	Absconded	Repatriated	Remaining
				Readmitted						
Males ...	...	202	56	:	258	35	18	:	2	203
Females ...	...	69	25	:	94	6	6	:	..	82
Total ...	...	271	81	:	352	41	24	:	2	285

LEPROSY.

Figures of Kedah patients in various Institutions.

Settlement		Remained	Admitted		Total	Discharged	Transferred	Absconded	Died	Remaining
				Readmitted						
Pulau Jerajak ...	...	141	28	:	169	:	:	9	13	147
Female Settlement, Penang ...	...	9	1	:	10	:	:	1	1	8
Federal Leper Settlement, Sg. Buloh ...	...	18	12	:	30	:	:	6	:	24
Leper Asylum, Kuala Lumpur ...	...	4	...	:	4	:	:	...	:	4
Total ...	...	172	41	:	213	:	:	16	14	183

LABORATORIES AT STATE HOSPITALS.

The number of specimens examined during the year was:

Alor Star	..	..	..	..	..	13,308
Sungei Patani	..	..	..	..	..	16,733
Langkawi	..	..	..	..	..	1,552
Baling	..	..	..	..	..	251
Kulim	..	..	..	..	..	11,884
					Total	.. 43,728

The above figures refer to ordinary routine examinations and are in addition to those given under Pathological Laboratory in Chapter IX.

POST MORTEMS.

The number of post mortems performed was as shown below:—

			Medico-legal.	Pathological.
Alor Star	..	..	.. 71	20
Sungei Patani	..	..	.. 65	..
Langkawi	..	..	.. 1	..
Kulim	..	..	.. 27	9
Baling	..	..	..	..
			Total .. 164	29

MAJOR OPERATIONS.

The following numbers of major operations were performed at the hospitals indicated:—

Alor Star	..	..	..	..	..	152
Sungei Patani	..	..	..	..	..	48
Kulim	..	..	..	..	..	47
Langkawi	..	..	..	..	..	1
Baling	..	..	..	..	..	..
					Total ..	248

VACCINATIONS.

NORTH KEDAH.

Hospital and District vaccinations	..	..	..	..	3,795
Out-door Dispensary, Alor Star town	..	..	..	..	1,272
" " Yen	..	..	..	..	1,211
" " Changloon	..	..	..	..	242
" " Jitra	..	..	..	..	150
" " Kuala Nerang	..	..	..	..	347
" " Padang Matsirat	..	..	..	..	54
Prison hospital, Alor Star	..	..	..	..	317

CENTRAL KEDAH.

Hospital and District vaccinations, Kuala Muda	..	..	..	3,252
" " Baling	..	..	..	439
Out-door Dispensary, Sik	..	..	..	358

SOUTH KEDAH.

Hospital and District vaccinations	..	..	..	2,218
Out-door Dispensary, Bandar Bahru	..	..	..	138

LANGKAWI.

Hospital and District vaccinations	..	..	..	140
Estate vaccinations done by the Health Branch	..	..	..	27,400
			Total ..	41,333

The large figure given in the last item is in respect of the vaccination campaign carried out in connection with the small-pox outbreak mentioned on page 6.

IX. PATHOLOGICAL LABORATORY.

Each hospital has its own branch laboratory which suffices for its local needs in the matter of ordinary routine examination of specimens, but all bacteriological, serological, and histological work is carried out at a central laboratory situated at Sungai Patani, the town which is geographically most central. The staff of this Central Laboratory is composed of a Pathologist, an Assistant Pathologist, a Laboratory Assistant and the usual office personnel. This heading concerns the work performed at the Central Laboratory only.

The total number of specimens examined during the year amounted to 7,413. To this total, the Estate hospitals contributed 1,513, the Police 137 and the Perlis Government hospital 213.

The amount of revenue collected was \$354 as against \$268 received last year.

The following is an outline of the work performed.

Blood for Sedimentation Test	..	..	..	..	..	1
Blood Sugar Estimation	..	..	..	..	..	18
Blood Urea Estimation	..	..	..	..	..	47
Van den Bergh Reaction	..	..	..	..	..	7
Blood Iron Estimation	..	..	..	..	..	3
Hb. Estimation	..	..	..	..	..	5
Blood Counts	..	..	..	..	..	10
Blood smears for M.P.	..	..	..	..	..	40
Blood Culture	..	..	..	..	..	31
Blood for Colour Index	..	..	..	..	..	2
Blood for Icterus Index	..	..	..	..	..	7
Blood for Fragility Tests	..	..	..	..	..	1
Blood for Widal	..	..	..	..	..	385
Blood for Weil-Felix	..	..	..	..	..	151
Blood for Uric Acid	..	..	..	..	..	1
Blood for Wassermann Reaction	..	..	..	..	..	2841
Blood for Kahn Reaction	..	..	..	..	..	2841
C.S.F. for Wassermann Reaction	..	..	..	..	..	1
C.S.F. for Kahn Reaction	..	..	..	..	..	1
Urine: Routine	..	..	..	..	..	14
Urine for T.B.	..	..	..	..	..	2
Urine for Acetone	..	..	..	..	..	1
Urine for Weil-Felix	..	..	..	..	..	2
Urine for Gonococci	..	..	..	..	..	3
Urine for Urea Estimation	..	..	..	..	..	8
Urine for Sugar Estimation	..	..	..	..	..	2
Urine for Culture (Typhoid)	..	..	..	..	..	96
Urine for Culture (B. Coli)	..	..	..	..	..	41
Stool for Occult Blood	..	..	..	..	..	1
Stool for Amoebae	..	..	..	..	..	4
Stool for T.B.	..	..	..	..	..	1
Stool for V. Cholerae	..	..	..	..	..	1
Stool for Analysis	..	..	..	..	..	1
Stool for Ova etc. (parasites)	..	..	..	..	..	4
Stool for Culture (Typhoid)	..	..	..	..	..	175
Stool for Culture (Dysentery)	..	..	..	..	..	38
Test Meals	..	..	..	..	..	17
Vomit for V. Cholerae	..	..	..	..	..	1
C.S.F.: Cell Counts	..	..	..	..	..	1
C.S.F.: Microscopical Examination	..	..	..	..	..	13
C.S.F. for Protein	..	..	..	..	..	1
C.S.F. for Culture	..	..	..	..	..	18
Sputum for T.B.	..	..	..	..	..	2
					Carried forward	6,840

						Brought forward	6,840
Pus for Culture .. ..	..	..	..	..	..		5
Pus Smears: Microscopical Examination .. ..	..	..	..	..	..		6
Pus for T.B. .. ..	..	..	..	..	..		1
Smears for Spirochaeta (Dark ground illumination) .. ..	..	..	..	..	..		1
Smears for M. Leprae .. ..	..	..	..	..	..		2
Eye smears: Microscopical Examination .. ..	..	..	..	..	..		1
Urethral smears .. ..	..	..	..	..	..		2
Vaginal smears .. ..	..	..	..	..	..		2
Skin Scale: Microscopical Examination .. ..	..	..	..	..	..		1
Throat Swabs .. ..	..	..	..	..	..		212
Nasal Swabs .. ..	..	..	..	..	..		21
Uterus Swabs .. ..	..	..	..	..	..		1
Preparation of Autovaccines .. ..	..	..	..	..	..		26
Histological Examination .. ..	..	..	..	..	..		49
Bacteriological Examination of Water .. ..	..	..	..	..	..		105
Animal Experiment .. ..	..	..	..	..	..		1
Police Exhibits (Human blood) .. ..	..	..	..	..	..		106
Police Exhibits (Animal blood) .. ..	..	..	..	..	..		1
Police Exhibits (Spermatozoa) .. ..	..	..	..	..	..		28
Police Exhibits (Pus) .. ..	..	..	..	..	..		1
Police Exhibits (Hairs) .. ..	..	..	..	..	..		1
						TOTAL	7,413

Of this total, 1,726 tests were carried out for Estates and Perlis Hospitals, as follows:—

ESTATES HOSPITALS.

Blood for Wassermann Reaction .. ..	..	..	..	..	..		667
Blood for Kahn Reaction .. ..	..	..	..	..	..		667
Blood for Sedimentation test (Westergren) .. ..	..	..	..	..	..		1
Blood Sugar Estimation .. ..	..	..	..	..	..		3
Blood Culture .. ..	..	..	..	..	..		4
Blood for Widal .. ..	..	..	..	..	..		80
Blood for Weil-Felix .. ..	..	..	..	..	..		6
Blood smears for M.P. .. ..	..	..	..	..	..		2
Urine: Routine .. ..	..	..	..	..	..		1
Urine for Culture (Typhoid) .. ..	..	..	..	..	..		6
Urine for Culture (B. Coli) .. ..	..	..	..	..	..		5
Stool for Culture (Typhoid) .. ..	..	..	..	..	..		12
Stool for Culture (Dysentery) .. ..	..	..	..	..	..		17
C.S.F. for Culture .. ..	..	..	..	..	..		1
C.S.F.: Microscopical Examination .. ..	..	..	..	..	..		2
Throat Swabs .. ..	..	..	..	..	..		11
Histological Examinations .. ..	..	..	..	..	..		3
Preparation of Autovaccines .. ..	..	..	..	..	..		2
Bacteriological Examination of Water .. ..	..	..	..	..	..		23
						TOTAL ESTATE HOSPITALS	1,513

PERLIS GOVERNMENT HOSPITALS.

Blood for Wassermann Reaction .. ..	..	..	..	..	..		56
Blood for Kahn Reaction .. ..	..	..	..	..	..		56
Blood Culture .. ..	..	..	..	..	..		9
Blood for Widal Reaction .. ..	..	..	..	..	..		21
Blood for Weil-Felix Reaction .. ..	..	..	..	..	..		21
Urine for Culture (Typhoid) .. ..	..	..	..	..	..		3
Stool for Culture (Typhoid) .. ..	..	..	..	..	..		5
						Carried forward	171

								Brought forward ..	171
Stool for Ova etc. (parasites)	..	..	..	..	..	..	..	..	2
Throat Swabs ..	..	..	..	..	..	..	..	..	7
C.S.F. for Culture ..	..	..	..	..	..	..	..	..	8
C.S.F.: Microscopical Examination	..	..	..	..	..	..	..	..	2
Pus Smears: Microscopical Examition	..	..	..	..	..	..	..	..	2
Histological Examination ..	..	..	..	..	..	..	..	..	3
Bacteriological Examination of Water ..	..	..	..	..	..	..	..	..	18
<hr/>								TOTAL PERLIS HOSPITALS ..	213
<hr/>									

X. STATISTICAL TABLES.

Merely as a matter of convenience the majority of tables, especially those referred to in Chapter II (Vital Statistics), have been collected to form a separate chapter; these tables are listed hereunder.

Table	I.	Comparative population figures by race.
,,	II.	Approximate population, Births, Deaths and Infantile Mortality for the chief Towns of Kedah.
,,	III.	Summary of Birth and Death Rates by race and sex.
,,	IV.	Summary of still births by race and sex.
,,	V.	Summary of Deaths and Death Rates by race and sex.
,,	VI.	Deaths grouped according to age, sex and nationality.
,,	VII.	Principal causes of death by race.
,,	VIII.	Infantile Mortality by race and sex.
,,	IX.	Malaria Notifications from estates, 1930—1937.
,,	X.	Malaria statistics.
,,	XI.	School Inspections (A and B).
,,	XII.	Spleen rates by Districts (Children).
,,	XIII.	Estate figures (A and B).
,,	XIV.	Deaths on European Estates (A, B, C, D and E).
,,	XV.	Deaths on Asiatic Estates.
,,	XVI.	Comparative tables for total estate population showing total deaths and death rates for 1935, 1936, 1937.
,,	XVII.	Prevailing Diseases among estates population.
,,	XVIII.	Record of Broncho-Pneumonia and Pneumonia (Unspecified).
,,	XIX.	Record of Measles.
,,	XX.	Hospital admissions.
,,	XXI.	Birth and Infantile Mortality rates on estates (A and B).

TABLE I.
Comparative Population Figures by Race.

Race	1st April CENSUS 1921	1st April CENSUS 1931	Mid-year 1937
Malays	237,031	286,262	319,260
Chinese	59,403	78,415	85,472
Indians	33,004	50,824	56,402
Non-Asiatics	300	411	631
Others	8,820	13,779	13,010
Total	338,558	429,691	474,775

TABLE II.
Approximate population, Births, Deaths and Infantile Mortality for the Chief Towns in the State.

Town	Population	BIRTHS		DEATHS		INFANTILE DEATHS	
		Number	Rate per mille	Number	Rate per mille	Number	Rate per mille
Alor Star	25,103	944	38	454	18	125	132
Sungei Patani	10,377	477	46	334	32	75	157
Kulim	7,686	325	42	274	36	64	197

TABLE III.

Summary of Births and Birth Rates by race and sex.

Race	Males	Females	Total	Rate per mille
Malays	6,022	5,632	11,654	36.5
Chinese	1,894	1,854	3,748	43.8
Indians	966	1,041	2,007	35.6
Non-Asiatics	6	1	7	11.1
Others	121	127	248	11.4
Total	9,009	8,655	17,664	37.2

TABLE IV.

Summary of Still-births by race and sex.

Race	Males	Females	Total
Malays	431	298	729
Chinese	67	64	131
Indians	65	57	122
Non-Asiatics	...	...	...
Others	3	3	6
Total	566	422	988

TABLE V.

Summary of Deaths and Death Rates by race and sex.

Race	Males	Females	Total	Rate per mille
Malays	3,389	2,876	6,265	19.6
Chinese	1,321	593	1,914	22.4
Indians	769	638	1,407	24.9
Non-Asiatics	1	...	1	1.6
Others	100	94	194	14.9
Total	5,580	4,201	9,781	20.6

TABLE VI.

Deaths grouped according to age, sex and nationality.

Age			Sex	Europeans	Eurasians	Chinese	Malays	Indians	Others	Total
0	...	...	{ M F	...	...	131 94	415 284	115 78	5 5	666 461
4 weeks	...	...	{ M F	...	...	70 38	205 152	36 23	1 2	312 215
3 months	...	...	{ M F	...	...	41 35	124 92	34 36	1 2	200 165
6	„	...	{ M F	...	...	54 42	117 91	53 57	4 1	228 191
1 year	...	...	{ M F	...	...	107 84	440 472	156 152	7 10	710 718
5 years	...	...	{ M F	...	...	40 39	205 198	29 28	1 1	275 266
10	„	...	{ M F	...	...	24 13	67 68	13 8	5 1	109 90
15	„	...	{ M F	...	...	22 17	69 96	10 19	5 4	106 136
20	„	...	{ M F	...	...	24 15	82 87	11 27	1 5	118 134
25	„	...	{ M F	...	...	46 27	92 117	34 51	3 4	175 199
30	„	...	{ M F	...	...	60 32	145 152	35 36	5 4	245 224
35	„	...	{ M F	...	...	81 28	134 130	68 33	6 4	289 195
40	„	...	{ M F	...	...	82 20	193 123	41 21	5 10	321 174
45	„	...	{ M F	...	...	101 16	107 62	40 15	7 5	255 98
50	„	...	{ M F	...	...	124 13	182 120	34 11	8 9	348 153
55	„	and over	{ M F	...	1	314 80	807 637	60 43	36 27	1,218 787
TOTAL			...	...	1	1,914	6,265	1,407	194	9,781

TABLE VII.
Principal Causes of Death by race.

		Malays	Chinese	Indians	Non-Asiatics	Others	Total
Diphtheria	...	...	1	7	1	...	9
Small-pox	...	...	3	1	...	...	4
Tropical Typhus	...	...	...	1	...	...	1
Chicken-pox	...	...	3	...	...	...	3
Old age	...	...	722	129	44	19	914
Violence	...	...	18	41	20	...	79
Pregnancy and child birth	...	...	163	25	19	2	209
Premature birth	...	...	709	182	193	7	1,091
Malaria	...	...	284	164	122	10	580
Enteric	...	...	2	7	1	...	10
Dysentery and Diarrhoea	...	...	90	85	192	3	370
Influenza	...	...	1	...	4	...	5
Tuberculosis (Pulmonary)	...	...	26	80	57	3	167
Tuberculosis (Others)	...	...	10	23	8	2	43
Leprosy	...	...	1	...	...	...	1
Syphilis	...	...	5	10	13	1	29
Ankylostomiasis	...	...	260	16	21	4	301
Fever Unspecified	...	...	2,762	498	138	96	3,494
Cancer	...	...	2	2	5	...	9
Beri-beri	...	...	99	31	11	3	144
Heart and Circulation	...	...	9	34	32	1	75
Pneumonia	...	...	13	75	202	1	291
Other lung diseases	...	...	239	110	49	16	414
Convulsions	...	...	606	205	106	8	925
Other causes	...	...	237	189	168	18	612
Total	...	6,265	1,914	1,407	1	194	9,781

TABLE VIII.
Infantile Mortality by race and sex.

Race		Males	Females	Total	Rate per mille
Malays	...	...	861	619	1,480
Chinese	...	...	296	209	505
Indians	...	...	238	194	432
Non-Asiatics	...	...	...	...	...
Others	...	...	11	10	21
Total	...	1,406	1,032	2,438	138

TABLE IX.
Malaria Notifications from Estates, 1930—1937.

Year		Hospitals	Lines	Total
1930	...	3,442	16,495	19,937
1931	...	3,229	9,600	12,829
1932	...	2,917	7,891	10,808
1933	...	4,894	9,484	14,378
1934	...	4,846	9,199	14,045
1935	...	8,629	9,571	18,200
1936	...	5,701	4,676	10,377
1937	...	7,726	5,438	13,164

TABLE X.

Malarial Statistics.

Holdings	Population	Cases notified			Malarial deaths			Total deaths			Percentage cases admitted to Hospital	Case fatality percent	Percentage malarial deaths of total deaths	Malarial deaths per mille					
		Hospital	Lines	Total	Hospital	Lines	Total	Hospital	Lines	Total									
European	43,842	7,333	5,212	12,545	52	2	54	759	179	938	58.4	286.1	.7	.04	6.8	1.1	5.7	1.2	
Asiatic	... 13,061	393	226	619	6	7	13	24	28	52	63.5	47.4	1.5	3.1	2.1	25.0	25.0	25.0	.9
Total	... 56,903	7,726	5,438	13,144	58	9	67	783	207	990	58.7	231.3	.7	.2	.5	7.4	4.3	6.8	1.2

TABLE XI—A.

VERNACULAR SCHOOLS.

Number of Schools registered	..	..	..	..	87
Number of Schools inspected	..	..	..	..	39
Number of children in the registers	..	..	..	..	5,741
Number of children inspected	..	..	..	..	4,690

Diseases	No. of Cases			Percentage
	Hospital	Lines	Total	
Spleen	4.11
Anæmia	96	1.91
Not vaccinated	104	2.07
Eye diseases	13	.26
Ear diseases	5	.09
Scabies	297	5.92
Other skin diseases	39	.78
Yaws	86	1.71
Caries class I	476	9.49
" II	434	8.65
" III	368	7.34

TABLE XI—B.

NON-GOVERNMENT SCHOOLS (CHINESE).

Number of schools inspected	..	..	..	..	3
Number of children in the registers	..	..	..	..	364
Number of children inspected	..	..	..	..	189

Diseases	No. of Cases			Percentage
	Hospital	Lines	Total	
Spleen	1	1.18
Anæmia	2	2.35
Not vaccinated	5	5.88
Eye diseases	3	3.53
Ear diseases
Scabies	4	4.71
Other skin diseases
Yaws
Caries class I	9	10.58
" II	6	7.06
" III	13	15.29

TABLE XII.

Spleen Rates by Districts among Malay School Children 1936 and 1937.

District	No. of children examined		No. of children with enlarged spleens		Spleen rate	
	1936	1937	1936	1937	1936	1937
Kubang Pasu	...	1,134	280	76	8	6.70
Padang Terap	...	122	...	14	...	11.48
Kota Star	...	816	2,059	48	53	5.88
Baling	...	599	441	38	29	6.34
Kulim	...	461	263	17	12	3.69
Kuala Muda	...	907	963	52	51	5.73
Bandar Bharu	...	248	342	29	12	11.69
Yen	...	503	143	30	19	5.96
Langkawi	525	...	22	...
						4.19

TABLE XIII—A.

Population on European Holdings.

Nationalities	Labourers		Dependents			Total	
	Males	Females	Adults	Children	Infants		
Malays	...	2,851	1,335	313	1,089	169	5,756
Indians	...	15,620	7,865	2,119	8,447	2,062	36,112
Chinese	...	1,289	103	188	173	52	1,805
Javanese	...	36	8	5	11	1	61
Others	...	54	...	38	15	1	108
Total	...	19,850	9,310	2,663	9,735	2,284	43,842

TABLE XIII—B.

Population on Asiatic Holdings.

Nationalities	Labourers		Dependents			Total	
	Males	Females	Adults	Children	Infants		
Malays	...	3,379	2,518	194	1,296	172	7,559
Indians	...	1,395	350	134	366	42	2,287
Chinese	...	2,237	199	212	374	69	3,091
Javanese	...	29	10	1	4	...	44
Others	...	60	10	6	4	...	80
Total	...	7,100	3,087	547	2,044	283	13,061

TABLE XIV—A.
Deaths on European Holdings.

Nationalities	Labourers		Dependents			Total Deaths
	Male	Female	Adults	Children	Infants	
Malays	3	1	2	3	12	21
Indians	9	3	21	32	86	151
Chinese	1	1	...	2	3	7
Javanese	...	...	...	...	...	...
Others	...	...	...	...	...	...
Total	13	5	23	37	101	179

Still-Births on European Holdings.

Nationality.	No. of Still-births.					
Malays	1
Indians	8
Chinese
Javanese
Others
					Total	9

TABLE XIV—B.
Deaths in Group Hospitals from European Holdings.

Nationalities	Labourers	Dependents			Total Deaths
		Adults	Children	Infants	
Malays	...	...	...	...	...
Indians	164	54	205	289	712
Chinese	3	...	1	...	4
Javanese	...	...	...	...	...
Others	1	...	...	...	1
Total	168	54	206	289	717

TABLE XIV—C.
Deaths in Government Hospitals from European Holdings.

Nationalities	Labourers	Dependents			Total Deaths
		Adults	Children	Infants	
Malays	...	...	...	...	...
Indians	27	3	6	4	40
Chinese	1	...	1	...	2
Javanese	...	...	...	...	...
Others	...	...	...	...	...
Total	28	3	7	4	42

TABLE XIV—D.
Death Rates from European Holdings.

Nationalities			Total population	Total deaths	Death rates
Malays	...	...	5,756	21	3.6
Indians	...	...	36,112	903	25.0
Chinese	...	...	1,805	13	7.2
Javanese	...	...	61	...	...
Others	...	...	108	1	9.2
Total		...	43,842	938	16.8

TABLE XIV—E.
Labourer Death Rates from European Holdings.

Nationalities			Total labourers	Total deaths	Death rates
Malays	...	...	4,186	4	.9
Indians	...	...	23,484	203	8.6
Chinese	...	...	1,392	6	4.3
Javanese	...	...	44	...	...
Others	...	...	54	1	18.5
Total		...	29,160	214	7.3

TABLE XV—A.
Deaths from Asiatic Holdings.

Nationalities	Labourers		Dependents			Total deaths
	Male	Female	Adults	Children	Infants	
Malays	2	1	2	7	5	17
Indians	3	...	...	1	6	10
Chinese	...	...	...	...	1	1
Javanese	...	...	...	...	...	...
Others	...	...	...	...	...	...
Total	5	1	2	8	12	28

Still-births on Asiatic Holdings.

Nationalities.	No. of Still-Births.					
Malays	2
Indians
Chinese
Javanese
Others
					Total	2

TABLE XV—B.

Deaths in Group Hospitals from Asiatic Holdings.

Nationalities	Labourers	Dependents			Total	
		Adults	Children	Infants		
Malays	
Indians	...	4	5	2	2	13
Chinese	...	3	3	1	...	7
Javanese
Others
Total	...	7	8	3	2	20

TABLE XV—C.

Deaths in Government Hospitals from Asiatic Holdings.

Nationalities	Labourers	DEPENDENTS			Total	
		Adults	Children	Infants		
Malays	
Indians	...	2	...	1	...	3
Chinese	1	...	...	1
Javanese
Others
Total	...	2	1	1	...	4

TABLE XV—D.

Death Rates from Asiatic Holdings.

Nationalities			Population	Deaths	Death rates
Malays	...	...	7,559	17	2.25
Indians	...	...	2,287	26	11.37
Chinese	...	...	3,091	9	2.91
Javanese	...	...	44	...	...
Others	...	...	80	...	...
Total	...		13,061	52	16.53

TABLE XV—E.
Labourers Death Rates from Asiatic Holdings.

Nationalities			Population	Labourers	Death rates
Malays	...	...	5,897	3	.51
Indians	...	...	1,745	9	5.16
Chinese	...	...	2,436	3	1.23
Javanese	...	...	39	...	...
Others	...	...	70	...	...
Total	...		10,187	15	6.90

TABLE XVI.

Comparative Tables for total Estate population showing total Deaths and Death Rates for the years 1935, 1936 and 1937.

1935.

No.	Class of Estates	Population	Death in lines	Deaths in Hospital		Total Deaths	Death Rates	Total Death Rates
				Govt.	Group			
1	European owned	36,619	222	43	598	863	23.6	...
2	Asiatic	12,901	51	4	32	87	6.7	...
	Total	49,520	273	47	630	950	...	19.2

1936.

No.	Class of Estates	Population	Death in lines	Deaths in Hospital		Total Deaths	Death Rates	Total Death Rates
				Govt.	Group			
1	European owned	36,016	169	45	477	691	19.2	...
2	Asiatic	10,719	47	2	20	69	6.4	...
	Total	46,735	216	47	497	760	...	16.3

1937

No.	Class of Estates	Population	Death in lines	Death in Hospital		Total Deaths	Death Rates	Total Death Rates
				Govt.	Group			
1	European owned	43,842	179	42	717	938	21.4	...
2	Asiatic	13,061	28	4	20	52	3.98	...
	Total	56,903	207	46	737	990	...	17.4

TABLE XVII.

Figures Showing prevailing Diseases among Estates populations admitted into Group Hospitals
from European and Asiatic Estates with Deaths by Months.

MONTH	MALARIA		ANKYLOSTOMIASIS		DYSENTERY		OTHER BOWEL DISEASES		PNEUMONIA		OTHER DISEASES		TOTAL			
	Admiss- ions	Deaths	Admiss- ions	Deaths	Admiss- ions	Deaths	Admiss- ions	Deaths	Admiss- ions	Deaths	Admiss- ions	Deaths	Admiss- ions	Deaths		
JANUARY	297	3	15	...	36	3	41	7	28	5	836	17	1,253	35
FEBRUARY	267	4	17	...	12	1	48	3	29	9	824	22	1,197	39
MARCH	465	4	18	...	16	...	53	3	25	8	991	18	1,488	33
APRIL	942	5	20	...	13	1	42	11	22	8	1,009	32	2,048	57
MAY	876	10	16	...	17	2	52	7	502	14	1,364	38	2,375	71
JUNE	730	7	12	...	29	2	88	10	70	24	1,640	38	2,569	81
JULY	560	4	19	...	38	6	64	10	54	23	1,423	41	2,158	84
AUGUST	760	5	14	...	37	3	81	11	38	15	1,453	43	2,383	77
SEPTEMBER	630	6	33	...	33	2	65	8	34	18	1,291	44	2,086	78
OCTOBER	524	...	23	2	22	3	66	10	47	11	1,179	42	1,861	68
NOVEMBER	908	5	21	...	23	2	63	10	41	5	1,231	40	2,287	62
DECEMBER	661	2	18	...	36	8	61	4	35	6	1,118	32	1,929	52
TOTAL	...	7,620	55	226	2	312	2	724	33	473	146	14,274	407	23,634	737	

TABLE XVIII.

Record of Broncho Pneumonia and Pneumonia (Unspecified) admitted into Government and Group Hospitals from European and Asiatic Estates.

MONTH	GOVERNMENT HOSPITALS								GROUP HOSPITALS								
	EUROPEAN ESTATES				ASIATIC ESTATES.				EUROPEAN ESTATES.				ASIATIC ESTATES.				
	Bronchc Pneumonia	Pneumonia Unspecified.	Broncho Pneumonia	Pneumonia Unspecified.	Bronchc Pneumonia	Pneumonia Unspecified.	Admis-sions	Deaths	Admis-sions	Deaths							
JANUARY	16	1	13	2	...	...	...	1	
FEBRUARY	7	2	21	6	...	...	...	...
MARCH	4	...	23	8	1	...	1	...	
APRIL	8	2	12	6	...	...	...	...
MAY	11	2	32	11	...	...	...	...
JUNE	1	...	...	...	21	6	39	15	...	...	...	...
JULY	1	1	1	...	14	6	32	15
AUGUST	14	6	20	5
SEPTEMBER	1	31	16	9	2
OCTOBER	2	33	7	12	2	1
NOVEMBER	23	1	14	3
DECEMBER	1	19	1	16	5
TOTAL	...	5	1	1	1	...	201	50	243	80	2	...	1	1	1

TABLE XIX.

Record of Measles cases admitted into Government and Group Hospitals from European and Asiatic Estates.

M O N T H	GOVERNMENT HOSPITALS				GROUP HOSPITALS				TOTAL	
	European Estates		Asiatic Estates		European Estates		Asiatic Estates			
	Admis-sions	Deaths	Admis-sions	Deaths	Admis-sions	Deaths	Admis-sions	Deaths	Admis-sions	Deaths
January	3	...	...	...	3	...
February	...	1	...	...	6	...	...	...	7	...
March	20	2	...	...	20	2
April	87	6	...	...	87	6
May	...	2	...	...	115	10	...	...	117	10
June	...	1	...	...	157	...	...	...	158	...
July	229	...	...	...	229	...
August	287	3	1	...	288	3
September	118	10	...	...	118	10
October	97	...	...	...	97	...
November	34	...	...	...	34	...
December	42	...	...	...	42	...
Total	...	4	...	...	1,195	31	1	...	1,200	31

TABLE XX.
Hospital Admissions.

ESTATE	GOVERNMENT		GROUP		TOTAL	
	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths
European	...	865	42	22,679	717	23,544
Asiatic	...	68	4	955	20	1,023
Total	...	933	46	23,634	737	24,567
						783

TABLE XXI—A.
Birth Rates and Infantile Mortality Rates on European Estates.

NATIONALITIES			POPULATION	BIRTHS	BIRTH RATE	INFANTILE MORTALITY RATE
Malays	...	...	5,756	69	11.99	202.9
Indians	...	...	36,112	1,389	38.46	260.6
Chinese	...	...	1,805	31	17.27	129
Javanese	...	...	61	...	...	...
Others	...	...	108	1	9.26	...
Total	...	...	43,842	1,490	33.9	255.0

TABLE XXI--E.

Birth Rates and Infantile Mortality Rates on Asiatic Estates.

Nationalities			Population	Births	Birth rate	Infantile mortality rate
Malays	...	...	7,559	25	3.31	160.00
Indians	...	...	2,287	28	12.24	107.14
Chinese	...	...	3,091	15	4.85	6.67
Javanese	...	...	44	...	...	...
Others	...	...	80	...	...	...
Total	...		13,061	68	20.4	273.81

APPENDIX A.

HEALTH SURVEY OF LANGKAWI ISLAND.

Dr. E. D. B. Wolfe in his capacity as Health Officer, North Kedah, paid a visit of inspection to Langkawi Island, and he spent the period January 9th to 23rd in carrying out a health survey which is interesting as well as useful. He was assisted by two Health Inspectors and one Field Assistant. The following report gives his findings.

The numbers of people examined at the various places were:

Places.	Persons Examined.	Estimated Population Muk.m.
MUKIM PADANG MASIRAT		
1. Kampong Padang Masirat ..	.. 177	
2. Kampong Kuala Teriang ..	.. 114	2,476
3. Bohor Raja ..	.. 92	
4. Kampong Padang Masirat Malay School	.. 107	
	<hr/> Total .. 490	<hr/>
MUKIM ULU MALAKA		
1. Malay School ..	.. 98	
2. Kampong Ulu Malaka ..	.. 161	
3. Kampong Bohor ..	.. 180	3,350
4. Nyor Chabang ..	.. 241	
5. Bayas ..	.. 392	
	<hr/> Total .. 1,072	<hr/>
MUKIM KEDAWANG		
1. Malay School ..	.. 104	
2. Kampong Kedawang ..	.. 203	2,291
3. Bohor ..	.. 134	
4. Temoyong ..	.. 58	
	<hr/> Total .. 499	<hr/>
MUKIM KUAH		
1. Kampong Kuah ..	.. 240	
2. Malay School ..	.. 135	4,175
3. Kampong Kisab ..	.. 140	
	<hr/> Total .. 515	<hr/>
MUKIM AYER HANGAT		
1. Malay School ..	.. 67	
2. Bohor Merah ..	.. 89	1,171
3. Padang Lalang ..	.. 68	
	<hr/> Total .. 224	<hr/>

Grand total 2,800 = 20.8% of total estimated population.

With the exception of Mukim Ayer Hangat where the population is almost entirely composed of Samsam Malays, and Kampong Kisab where the majority are Langkawi-born Achinese Malays, all those examined were Kedah and Langkawi Malays.

Topography.

Langkawi is predominantly a limestone island. In the centre of the island is Gunong Raya (height 2,888 ft.) with its foothills radiating from it. To the North West is the rugged Machinchang range of hills, while between Mukim Padang Masirat and Kubang Badak is a low range of hills about 5 miles long comprising the Bohor Forest Reserve.

The *kampongs* are situated on the flat lands adjacent to land suitable for rice cultivation.

The island is notable for the absence of streams and rivers of any size.

Most of the soil of Padang Masirat and Kedawang is sandy. The *kampongs* are situated on *permatangs*, while the low lying land in between *permatangs*, where there are accumulation of claylike soil, is devoted to rice cultivation.

Cultivation and Crops.

The rice land on the island is on the whole low yielding. Much has been done to irrigate the rice fields, but a lot remains to be done. There is a notable scarcity of fruit trees in the island.

Near the coast where the soil is sandy it was not expected to find much fruit beyond *nangka*, *chempedak* and *chermai*; but inland in Mukim Ulu Malaka where the soil is clay it was surprising that there was not more fruit grown. The reason usually given by the inhabitants was that fruit trees would not grow. It is difficult to believe this.

Kampong Kisap in Mukim Kuah was the only *kampong* in which Rambutan, Durian and Mangosteen trees were seen. In many of the *kampongs* visited small vegetable gardens were seen. Several of these belonged to Malays.

In Kedawang there appeared to be very few vegetables. The Penghulu, however, has recently opened up a small plot as an experiment. Bat guano from a neighbouring island is being used as manure. At the time of my visit the vegetable seedlings has just been planted out. Should the experiment prove successful the Penghulu told me that he hoped to clear more *belukar* for this purpose. The vegetables will prove a very valuable addition to the local diets, and the experiment should receive every possible encouragement.

Epidemiology.

Traces of old small-pox were seen in a number of people about the age of forty.

No Beri-Beri or Filariasis was seen. No history of recent epidemics, other than malaria, were obtained, and these in certain areas only.

Migration.

There is little or no migration except from *Mukim* to *Mukim*. In years when the Langkawi rice crop is poor, a certain number of people go to the mainland to help in the harvest, but they return to the island afterwards.

Sanitation.

I was impressed with the general standard of cleanliness in the *kampongs*. In the the larger *kampongs*, the compounds of the houses were remarkably clean. This may be due to some extent to the scavenging propensities and voracious appetites of the local dogs, of which there are large numbers.

Except in the case of Government buildings, such as schools and police stations etc., latrines are few and far between. For the most part defaecation is carried out in the neighbouring *belukar* and undergrowth.

No gross fly nuisance was noted. Most of the latrines provided for Government buildings are of the "mound" type.

Water Supplies.

In Kuah there is a piped water supply from a small reservoir on a hill, but elsewhere all water is obtained from shallow unprotected wells open to pollution, except at schools and other Government buildings where protected wells are provided.

Well water appeared to be plentiful in spite of the draught. In Kedawang, however, I was told that some difficulty is experienced in obtaining water. The wells there were much deeper than elsewhere.

In Ulu Malaka the river is used as a source of supply.

Malaria.

Malaria was said to be absent from Padang Masirat, though it was admitted that a certain amount of "fever" occurred during the wet season. Spleen rate was nil. In Ulu Malaka it was admitted that fever occurred during the wet season. Spleen rates were low. There was a history of an epidemic of malaria during the previous year at Kampong Bayas and Kampong Mata Ayer, which *kampongs* are close to one another.

In Kedawang most of the few spleens found came from one *kampong* situated on the *mukim* boundary near Bayas, Kampong Chandek Kora.

Kuah is known to be malarious, although the malaria is now controlled by drainage and oiling. Spleens found at Kampong Kisap were mostly greatly enlarged.

The following table gives the findings of examinations:

No.	Mukim	Kampong	Total exam.	Spleen	Spleen rate	No. of blood specm. taken	Number Positive	% Positive
1	PADANG MASIRAT	Padang Masirat	177	Nil	Nil	108	11	10.18
	Estimated Population 2,476 ...	K. Teriang	114	1	.88	...	...	...
	All Races ...	Bohor Raja	92	...	...	71	2	2.82
		Malay School	107	...	...	...	...	...
			490					
2	ULU MALAKA	Malay School	98	6	6.12	6	4	66.67
	Estimated population 3,350 ...	Ulu Malaka	161	1	.62	...	...	...
	All races ...	Bohor	180	3	1.67	115	11	9.57
		Nyor Chabang	241	1	.46	...	...	...
		Bayas	392	27	6.86	104	23	22.12
			1,072					
3	KEDAWANG	Malay School	104	1	.96	104	12	11.54
	Estimated population 2,291 ...	Kedawang	203	8	3.94	4	...	...
	All races ...	Bohor	134	1	.75	105	10	9.62
		Temoyong	58	...	...	1	...	...
			499					
4	KUAH	Kuah	240	17	7.08	50	...	...
	Estimated population 4,175 ...	Malay School	135	11	8.15	72	7	9.72
	All races ...	Kisap	140	49	35.	53	15	28.33
			515					
5	AYER HANGAT	Malay School	67	4	5.07	10	3	30
	Estimated population 1,171 ...	Bohor Merah	89	4	4.49	30	3	10
	All Races ...	Padang Lalang	68	2	2.94	15	2	13.33
			2,800	136	4.86	848	103	12.15

Haemoglobin Indices were as follows:—

		Over 80%	70-80 %	65-70 %	50-60 %	Under 50 %	Total
Men	421 = 45.1	429 = 45.9	71 = 7.7	12 = 1.3	933
Women	129 = 27.4	276 = 58.6	64 = 13.6	2 = 0.4	471
Children	138 = 10.6	632 = 48.6	475 = 35.7	56 = 4.3	1,301
			688 = 25.5	1,337 = 49.4	610 = 22.5	70 = 2.6	2,705

Yaws.

Distribution was as follows:—

Mukim of Padang Masirat	..	..	..	..	..	6 children.
„ Ulu Malaka	..	..	..	..	..	8 „
„ Kedawang	..	..	..	..	..	6 „
„ Kuah	..	..	..	..	..	None.
„ Ayer Hangat	..	..	..	..	..	None.

Nearly all the cases in Kedawang had received at least one N.A.B. injection.

Considering that at Padang Masirat there is a Dispensary at which injections are given regularly, and that regular visits are paid by the dresser to *kampongs* in Padang Masirat and Ulu Malaka, the figures are unnecessarily high for these two *mukims*. There is no excuse for the parents on grounds of remoteness from medical help. There appears to be an unfortunate belief amongst the *raayat* that injections should not be given until the disease is well developed. The names of all cases seen were given to the Penghulus and to the dresser, and the former were instructed to see that the children were taken for injection when the next dresser visited the *kampong*.

It should be an easy matter to wipe out Yaws in the island once the value of early injection is realized. In this connection Penghulus and Panglimas can be of the greatest possible assistance.

Leprosy.

No cases were seen, and Penghulus all denied that there were any cases known to them.

Parasitic Diseases.

It appeared from general observations that worm infestation, especially of children of school age, was high. Absence of latrines would contribute towards this.

The use of shoes would help to diminish the Hookworm rate, but unfortunately rubber soled shoes are too expensive for general use on a large scale.

There was no opportunity to do a worm survey during the present survey. Steps have been taken to give worm treatment in the schools.

Skin Diseases.

Skin diseases were noted as follows:—

		Tinea.	Scabies.	Impetigo.
Adults	413	4
Children	227	37

Eye Diseases.

These were notably absent in those people examined. Only two cases of gross eye disease were noted.

Dental Caries.

Adults	..	..	..	..	..	..	543
Children	..	..	..	..	..	..	730

The accuracy of the above figures cannot be guaranteed, as the writer does not possess any special knowledge of dentistry, and examinations were only cursory.

Nutrition.

From general impressions, it appeared that on the whole children of school age were poorly nourished, this being more noticeable in *mukims* not near the sea. Possibly this may be accounted for by a higher consumption of fish nearer the coast. Amongst the adult population the impression gained was that the Sam Sam inhabitants of Ayer Hangat were better nourished than the adults of other districts.

Unfortunately it was not possible with the staff available to investigate quantitatively any diets.

No gross evidence of under nutrition was noted. Generalisations as to nutritional state can be of little value; the writer, therefore, does not propose to include any more remarks under this heading until figures have been worked out and assessed.

A total of 2,800 Palidise measurements were made; of these only 0.39% were certified. This high figure of uncertified measurements is a result partly of the comparatively recent introduction of proper Birth Registration in Langkawi, and partly to the fact that Penghulus seemed unable to appreciate the fact that the people were required to bring their birth certificates. The numbers of people produced by the Penghulus for examinations were very disappointing.

APPENDIX B.

NEW POLICY REGARDING THE CONTROL OF LEPROSY.

It is thought that the matter of leprosy is of such importance that a special appendix on it is justified.

During 1937 big changes in the outlook of the whole subject took place, the climax being reached when repeal of the legislation then in force was decided on and a new law was drafted; the new enactment, however, had not yet become law at the end of the year.

The previous policy was in conformity with the meagre but explicit legal provision in force, such provision consisting solely of three sections of the Quarantine and Prevention of Diseases Enactment which read as follows:

“Section 32.—The officer in charge of any police district on receipt of information that there is within such district a person affected or suspected of being affected with leprosy shall send such person to be examined by the State Surgeon or a Medical Officer as the case may be.

Section 33.—On receipt of a written certificate from the State Surgeon or a Medical Officer to the effect that such person is a leper such officer shall apply to the nearest Magistrate for an order authorising the removal of such leper to a hospital or other place provided for the reception of lepers either within or without the State.

Section 34.—Such order shall be in writing, signed by the Magistrate granting the same and by the certifying Medical Officer and shall be sufficient authority for the removal of such leper to the place specified in such order.”

It is obvious that a system entailing arrest and detention of lepers by the police is not only unsuitable but eminently conducive to concealment of cases. Ample proof of the existence of many lepers in hiding is available.

The actual procedure was as follows: a leper is “caught” by the police; he is certified as such and sent under a police escort to a leper hospital in the Straits Settlements or the Federated Malay States according to his nationality.

A memorandum setting out the position and embodying proposals for a revision of the general policy with regard to lepers had been sent to the Kedah Government in November 1936. The question of increased accommodation for lepers in the Federated Malay States had also cropped up. An Informal Committee went into the question in respect of the whole of Malaya.

The recommendations of this Committee were adopted with the result that a new enactment provides for dealing with lepers without police intervention and isolating only those who show signs of being infectious. On the introduction of this law the cause of previous inducement to hide will be removed, and the treatment of a number of lepers without forcibly detaining them in isolation will become practicable. It is hoped that by this means most of the lepers hitherto kept in hiding will come forward voluntarily, seeking treatment.

Although a cure is still one of the most problematical issues in therapeutics, the alleviation of distress, both physical and mental, is bound to go a long way towards establishing confidence and inducing all lepers to apply for remedial measures. The benefit from extension of treatment to the many lepers who had been avoiding discovery will not only be felt by the patients themselves but will be also very appreciable to the general community.

That something had to be done, especially in respect of Malays, is perhaps best illustrated by stating that during 1935 the total number of lepers certified was 67, out of whom only 9 were Malays. During 1936 the number of lepers certified was 63; of these 27 were Malays, but of these 27 only 4 were detected in the usual way by the police; 23 were discovered by Health Department Officials during a Health Survey of Sik and Jeneri, two very undeveloped districts of Kedah.

APPENDIX C.

A CASE OF HYDROPHOBIA.

Rabies amongst dogs is unpleasantly prevalent in both Kedah and Perlis, and, although dog bites are by no means a rare occurrence, cases of human hydrophobia are few and far between, the reason for such scarcity being the promptitude with which anti-rabic treatment is sought and administered. As, fortunately, few have seen actual cases of human hydrophobia, the following notes of a case may be worth perusing.

The case occurred in Perlis; a Malay man, aged about 30, was bitten in the right leg by a dog, about the end of July. Nothing is known of the dog; in fact no notice whatever was taken of a mere dog bite; very little pain and no visible damage produced no urge in the victim to do anything at all.

One month after the occurrence the patient began to "feel weak", and, having heard that a friend of his somewhere else had died from having been bitten by a mad dog, he came into the Government hospital at Kangar for admission.

The following notes are by Dr. Sivasambandam, the Assistant Medical Officer who dealt with the case:

"The patient was admitted into hospital at 10.30 a.m. on 29-8-37 with a history of having been bitten by an unknown dog without any provocation, on the inner aspect of the upper third of his right leg.

His complaint was general weakness, itchiness all over the body and numbness and pain in the back. The scar about the right leg was tender, but in a condition of healing. He was afraid he might develop hydrophobia, hence he sought admission into hospital. At the time of admission there was no difficulty of swallowing, but he was mentally very distressed and anxious.

I was called to see him at 5 a.m. on 30-8-37. He was sitting up in bed with a cold and clammy sweat, complaining that he could not sleep, and that he had a secret dread of impending death. His eyes were staring. I suspected that he had developed hydrophobia. I gave him a cup of water to drink. He refused to drink; the mere sight of water brought on a spasm of his throat.

He was at once given injections of atropine sulphate 1/100 grain every four hours. He could not take any feeds. He was sitting up in bed, staring. In the afternoon he begged to be taken back to his house where he wanted to die. He died in his house at about 8 p.m. that night.

I have seen three or four cases of hydrophobia in Perlis during the past few years. The earliest symptom complained of by the patient is the general pruritus of the whole body; this symptom precedes the actual onset of hydrophobia by 4 or 5 days. I have seen two cases in which the itching was so intolerable that the patient had used a piece of wood to rub his whole body, with the result that bleeding scratches were produced all over the body."

REPORT OF THE MEDICAL DEPARTMENT, PERLIS, FOR THE YEAR 1937.

I. ADMINISTRATION.

(a) STAFF.

The work of the Medical Department is supervised by the State Surgeon, Kedah, the staff of the department itself comprising the following whole time appointments:

one Assistant Medical Officer,
one Assistant Health Officer,
one Hospital Assistant grade I,
one Dresser grade II,
two Dressers grade III,
one Vaccinator,
one Mosquito Collector and Identifier,
one Midwife.

(b) CHANGES IN STAFF.

Dr. R. Sivasambandan, Assistant Medical Officer, went on vacation leave for a period of four months (March 13th to July 9th) and was relieved by Dr. N. Paramanathan, Assistant Health Officer. Dr. N. Paramanathan was sent to Sungai Patani for a period of two months (13th July to 17th September) for training in health work.

A resident Dresser has been stationed at Kaki Bukit from 22nd October, from which date the local out-door dispensary has been open daily.

(c) LEGISLATION.

The following Enactments having a bearing on Medicine and Public Health were passed during the year:—

Enactment No. 2/1356—An Enactment to provide for the adoption of the air navigation laws of the Straits Settlements.

Enactment No. 7/1356—The Small Offences Enactment.

Enactment No. 8/1356—An Enactment to amend the deleterious Drugs Enactment of 1348.

Enactment No. 10/1356—The Chandu Enactment, 1356.

(d) FINANCIAL.

Revenue Collected	\$ 1,948.93
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Expenditure:—

(a) Personal Emoluments	\$18,647.57
(b) Other Charges	\$14,898.42
(c) Special Expenditure	\$ 2,663.67
(d) Special Services, P.W.D.	\$ 9,440.00

Total	..	\$45,649.66
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The total expenditure represents 6.06% of the total revenue or 7.17% of the total expenditure of the State during 1937.

In addition, a sum of \$2,990.57 was spent for Kaki Bukit from the Kaki Bukit Health Fund.

(e) MEDICAL INSTITUTIONS.

State Hospital, Kangar 86 Beds.

Out-door Dispensary, Kaki Bukit.

Railway Out-door Dispensary, Padang Besar (administered by the Railway authorities).

There is an out-door dispensary at Kangar Hospital. A Travelling Dispensary pays regular fortnightly visits to schools, villages, cooly lines and police stations accessible by roads and paths.

(f) BUILDINGS.

The following buildings were completed and occupied during the year:

quarters for the Assistant Health Officer;

Dresser's and Attendant's quarters, Kaki Bukit;

dog kennels (for the observation of dogs suspected of rabies).

In addition, the Hospital kitchen was reconstructed and the mortuary removed and rebuilt on a new site with a satisfactory approach road to it.

New concrete drains were laid for the Malay houses, and the concrete drains and aprons of the male ward and office were regraded and repaired. The old medical store was converted into an office for the Assistant Health Officer; also various minor measures, such as concreting the floor of the female ward, partition in the main ward etc., were carried out.

II. PUBLIC HEALTH.

Twelve cases of cerebrospinal fever (all Chinese—mostly mining coolies—7 males and 5 females) were notified during the year—the first on January 4th and the last on December 12th. Ten of these were treated at Kangar Hospital with five deaths, while the remaining two (with no deaths) went direct to Alor Star Hospital. Eleven cases came from Kaki Bukit and its suburbs, and one, an infant, a case of posterior basic meningitis (which had no relation with the outbreak at Kaki Bukit), came from Mata Ayer.

The sanitary condition of the *kongsis* on the hills is very unsatisfactory; the sanitation of Kaki Bukit Village with its narrow, ill-ventilated cubicles in most of the houses leaves much to be desired; conditions were ideal for the spread of cerebrospinal fever. About the middle of July the disease, which had been sporadic, threatened to assume epidemic proportions; five cases were reported in a week; prompt and energetic measures were undertaken and the outbreak was suppressed. Subsequent cases were sporadic cases from the hills.

Two cases of diphtheria (with one death) were admitted into hospital.

32 cases of chicken-pox, and two cases of measles with no deaths were seen during the year.

4 cases of typhoid fever (with one death) and one fatal case of paratyphoid fever were admitted into hospital; in the Register of Deaths, 9 deaths outside the hospital have been ascribed to enteric fever.

No cases of tropical typhus were reported.

29 cases of dysentery with 3 deaths were treated at the hospital against 16 cases with no deaths in 1936. About half of them (14) were amoebic.

82 cases of ankylostomiasis (with one death) were treated at the hospital against 96 with 5 deaths in 1936.

54 cases of tuberculosis (51 pulmonary and 3 other types) were admitted into hospital with 11 deaths against 40 with 12 deaths in 1936. 47 deaths from tuberculosis in the State were recorded against 42 in 1936.

As usual fevers account for the largest portion of the total deaths—395 against 447 in 1936. There was an increase in the number of admissions for malaria—445 against 394 in 1936, while the mortality was less—10 against 14 in 1936.

Infantile convulsions caused frequent deaths—127 against 150 in 1936.

Deaths from respiratory diseases (including pulmonary tuberculosis) are next in order to fevers and were responsible for 173 deaths in the State (180 in 1936).

The total death rate was 18.31. Total deaths amounted to 965. The number in 1936 was 1,015.

The infantile mortality records show 189 deaths against 218 in the last year, the rate being 105.41 against 116.64 in 1936.

Total births registered during the year were 1,793; the crude birth rate was 34.02. The figures for 1936 were 1,869 and 35.98 respectively. 105 still-births were recorded as against 92 in 1936. 13 deaths were recorded as due to affections connected with pregnancy and parturition, or a percentage of 0.68 to total births. The figure for 1936 was 22 deaths, or a percentage of 1.12.

The health of the prisoners in Kangar Gaol was satisfactory. Of the 31 prisoners who remained in the gaol at the beginning of the year, and of the 203 who were admitted during the year, 63 cases were admitted into hospital. (For further details, vide Appendix B, page 57).

The health of Government officials was fairly satisfactory; all were examined for signs of pulmonary tuberculosis and three were found to be suffering from active disease.

All the women teachers of Malay Vernacular Schools were given a thorough physical examination (for the first time) by the Lady Medical Officer, Kedah, whose services were specially requisitioned, and who gave valuable advice on the health and personal hygiene of each individual case.

Larval surveys by the Health Department showing the prevalent types of anophelines are summarised in Appendices C and D on pages 58 and 59 respectively.

HYGIENE AND SANITATION.

The principal villages of the State are Kangar, Arau, Kaki Bukit, Padang Besar and Kuala Perlis; all except the last named are controlled by a Sanitary Board.

(a) *Anti-Malarial Measures.* No epidemic of malaria is recorded, but the study of investigations carried out in the State during the year indicates clearly that endemic areas exist. Tasoh and Kaki Bukit are two such areas. There is no doubt that better control on these places by anti-larval and drug prophylaxis must effect a decrease in the figures in the years to come. There were 457 cases with 10 deaths as compared with 411 cases with 14 deaths during 1936.

Mosquito surveys were carried out in all the Sanitary Board Areas and they were identified as shown in appendices D (page 59) and E (page 60). Mosquitoes could not be dissected as the laboratory is not yet fully equipped. Anti-malarial measures, such as clearing, oiling, and draining marshy and seepage areas, were carried out in Kangar and Kaki Bukit. During the latter part of the year similar measures were carried out in Arau as well. Measures against mosquitoes other than the malaria carriers were restricted by lack of funds.

It is proposed next year to carry out mosquito trapping with human bait traps, mosquito dissections and blood examinations for determining the parasite rate as far as staff and funds permit.

(b) *Conservancy.* Night soil in all the Sanitary Board areas is disposed of through the medium of the Sanitary Board by trenching some distance away from the centre of all activities in the village or town. The Bucket System is in vogue, and the Board have fixed a standard pail and three different types of latrines suitable for local conditions. Almost every house in the Sanitary Board areas is equipped with a standard pail and an approved type latrine.

(c) *Refuse Disposal.* Refuse in each Sanitary Board area is disposed of mainly by incineration. The new incinerator at Jejawi is put to full use. Control tipping is being carried out in a low-lying area in Kangar near the pig slaughter house.

(d) *Burials and Cremations.* The burial ground at Jejawi was opened during the year for private burials and cremations. The land adjoining the hospital burial ground has been cleared and partitioned off for Hindus, Sikhs and Siamese. Burials and cremations are now performed in a systematic and satisfactory manner.

(e) *Water Supply.* The Sanitary Board areas of Kangar, Arau and Padang Besar are supplied with piped water. The water supply to Arau and Kangar continued to be satisfactory for a filtered, but otherwise untreated, supply. Coming from limestone hills this water is extremely hard.

The source of water supply at Padang Besar is a surface lake. This is liable to dangerous pollution. The Railway authorities are proposing to set this right by installing a "BELL" filter plant.

Kaki Bukit still derives its water supply from unprotected wells and pits. The question of a pure water supply can only be considered and solved when the village is shifted to a better and permanent site. A new site has already been surveyed.

(f) *Food in relation to Health and Disease.*

(1) **MARKETS.** Improvements and additions were carried out in the Kangar Market for which an improved type of stall has been designed.

(2) **EATING SHOPS.** All shops were subjected to examination and licensing; definite and considerable improvements are to be recorded with regard to their sanitary condition.

(3) **STREET STALLS AND HAWKERS.** These caused the usual trouble, but action was taken during the year to eliminate the most unsatisfactory ones. All are now licensed, and licensees are examined at regular intervals.

(g) *Kaki Bukit.* Energetic measures were adopted to ameliorate the health conditions in this mining village. Malaria is a daily occurrence in almost every house. Meningococcal meningitis seems to be endemic in this neighbourhood, but outbreaks, though naturally a source of worry to the Health authorities, are kept in check by prophylactic measures.

A resident dresser is now stationed at the dispensary at Kaki Bukit. A certain amount of permanent anti-malarial work is being undertaken in this village. An automatic sluice has been constructed on the Bunut. This river had been rich in anopheline larvae, but the periodic rush of water from the automatic sluicing device now keeps it completely free. It is hoped that during next year a similar sluice will be constructed in the Pelarit river, though this is less dangerous as a source of malaria than the Bunut.

A dangerous seepage ravine near the Police Station is to be sub-soiled. All materials are now ready and it is expected that it will be completed very shortly.

(h) *Kuala Perlis.* This is a coastal village with a population of about four thousand, mostly fishermen. The new road from Kangar to Kuala Perlis has been metalled as far as Kayang. Beyond this place the road is still an earth one; it is expected that this part of the road will be metalled before the middle of next year.

The problem of a pure water supply to the village has almost been solved by the reservoir at Wei.

(i) *Sanglang.* This is one of the biggest and most populous *mukims* in the State; but owing to lack of proper roads it has in the past been practically inaccessible to the staff of the medical department. Consequently the visits of the travelling dispensary to this *mukim* were few and far between. During this year a gravel road, which can be negotiated by car, from Kayang to Simpang Empat (a central and important village in the area), was constructed. It is proposed to extend this road to Kuala Sanglang—an insanitary seaside village bordering on the State of Kedah, similar to, but smaller than, Kuala Perlis. This road when metalled and completed will contribute a good deal towards the improvement of the health and the economic and social conditions of the inhabitants of this *mukim*. Moreover it has been decided to erect an out-door dispensary at Simpang Empat next year.

RABIES.

Fourteen cases of dog bite were reported, the first on March 13th and the last on December 25th. Eleven dogs were concerned in all; one was an unknown stray dog; seven were declared not rabid after being kept under observation for ten days; one escaped while under observation and could not be traced; two were killed on the spot.

The brains of the two dogs were sent to the Institute for Medical Research, Kuala Lumpur, through the State Veterinary Surgeon, Kedah, and both were reported to be positive for rabies. Of the seven persons bitten by dogs actually rabid or suspected to be rabid, two went to Alor Star Hospital for treatment, three were treated at Kangar Hospital, one refused treatment and the other (bitten by an unknown stray dog) reported himself at the Hospital a month after the bite and developed hydrophobia the day after admission (vide page 41). The person who refused treatment also died a month after the bite; it was stated that he developed symptoms of Hydrophobia before his death.

The usual measures to combat rabies were enforced, a total of 1,847 dogs being destroyed during the year.

OFFICIALS.

The following table gives the Health Statistics of Government Officials (including subordinates) in Perlis:—

		Europeans.	Asiatics.
Total number of Officials resident	.. ..	3	360
Average number resident	.. ..	2	360
Total number on sick list	.. ..	1	119
Total number of days on sick list	.. ..	4	1,391
Average daily number on sick list	.. ..	0.01	3.81
Percentage of sick to average number resident	..	50.00	33.06
Average number of days on sick leave for each patient	.. .. .. ..	4.00	11.69
Average sick time to each resident	.. ..	2.00	3.86
Total number invalided	.. ..	—	7
Percentage of invalidings to total resident	.. ..	—	1.94
Total Deaths	.. .. .. ..	—	2
Percentage of deaths to average resident	.. ..	—	0.56
Number of cases of sickness contracted away from residence	.. .. .. ..	—	—

SCHOOLS.

Owing to the absence on leave of the Assistant Medical Officer during part of the year and the absence for training in Kedah of the Assistant Health Officer during another period, inspection of schools was somewhat less thorough than usual. Ten schools were, however, inspected.

Total number of children on register	.. .. ..	1,153
Total number of children inspected	.. .. ..	948

No.	Diseases	No. of Cases	Percentage
1	Spleenic enlargement	166	17.5
2	Anæmia	163	17.2
3	Not vaccinated { never vaccinated	53	5.6
	vaccinated, but not taken	11	1.2
4	Eye diseases	3	0.4
5	Ear diseases	1	0.1
6	Scabies	16	1.7
7	Other skin diseases	2	0.2
8	Yaws	10	0.1
9	Bronchitis	3	0.4
10	Early leprosy	35	3.7
11	Pre-tuberculosis	301	30.6
12	Dental Caries .. .. ..	...	...

37 school children had N.A.B. injections for yaws.

VACCINATIONS.

1,796 vaccinations were done during the year.

Malays	..	..	..	..	..	..	1,434
Chinese	..	..	..	..	..	..	303
Indians	..	..	..	..	..	..	23
Siamese	..	..	..	..	..	..	36
						Total	1,796

ESTATES.

Nationality	LABOURERS		DEPENDENTS			Total	
	Males	Females	Adults	Children	Infants		
Malays	...	47	17	1	6	3	74
Indians	...	161	93	10	49	48	361
Chinese	...	1	...	...	...	...	1
Total	...	209	110	11	55	51	436

There were six deaths in the estate population (3 infants, 1 child dependent, 1 adult dependent and 1 labourer—all Indians). 15 live births (3 still-births) among the Indian Estate population were registered during the year. Admissions from estates into hospital amounted to 149 Indians with 5 deaths as against 108 cases with 5 deaths during 1936.

VITAL STATISTICS.

(a) The population of Perlis for the middle of 1937, determined by the balancing equation method, was 52,703. (This figure is arrived at by adding to the last year's figure the excess of births over deaths, since the effect of immigration and emigration on the total population may be considered to be practically negligible. The geometrical progression method had been used to estimate population up to 1934).

The following is a comparative table for the last six years:—

Year	Estimated Population	Births	Birth rate per mille	Deaths	Death rate per mille
1932	49,800	1,272	25.54	743	14.92
1933	51,644	1,436	27.81	855	16.56
1934	52,723	1,730	32.81	885	16.79
1935	51,101	1,640	32.09	850	16.63
1936	51,951	1,961	37.75	1,019	19.61
1937	52,703	1,793	34.02	965	18.31

Population according to race with deaths and death rate.

Races	Approximate Population	Deaths	Death rate per mille
Europeans	...	...	...
Eurasians	...	...	...
Chinese	...	173	27.80
Malays	43,497	725	16.67
Indians	977	23	23.54
Others (mostly Siamese)	1,992	44	22.09
Total	52,703	965	18.31

There were 189 deaths among infants under one year old, the rate being 105.41 per mille.

Infant death rate for the last 6 years was:—

Year.	..	..	..	..	Deaths.	Rate per mille.
1932	..	..	..	..	130	105.01
1933	..	..	..	..	134	96.40
1934	..	..	..	..	139	83.43
1935	..	..	..	..	122	79.07
1936	..	..	..	..	218	116.64
1937	..	..	..	..	189	105.41

The infantile death rate per thousand births among the principal nationalities was:—

Malays	..	..	..	..	..	96.34
Chinese	..	..	..	..	..	143.97
Indians	..	..	..	..	..	130.43
Siamese	..	..	..	..	..	179.49

Still-births according to nationality and sex.

Nationality	Males	Females	Total	Rate per mille
Europeans
Eurasians
Malays	...	772	702	1,474
Chinese	...	144	113	257
Indians	...	12	11	23
Siamese	...	16	23	39
Total	944	849	1,793	34.02

Still births according to sex and nationality.

Nationality	Males	Females	Total
Europeans	...	...	...
Eurasians	...	...	...
Malays	51	38	89
Chinese	8	4	12
Indians	1	2	3
Siamese	1	...	1
Total	61	44	105

Distribution of deaths according to Nationalities, Sex and Diseases:

Diseases	Malays		Chinese		Indians		Siamese		Total		Total	Rate per mille of population
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.		
Malaria	5	3	9	...	1	1	...	...	15	4	19	0.36
Enteric fever	6	2	1	...	...	...	...	1	7	3	10	0.19
Dysentery	...	1	1	1	...	...	...	...	1	2	3	0.06
Tuberculosis (Pulmonary)	25	10	8	...	1	...	2	1	36	11	47	0.89
Ankylostomiasis	...	...	...	...	...	1	...	...	...	1	1	0.02
Ascariasis	...	...	...	...	1	...	...	...	1	...	1	0.02
Fever unspecified	160	142	35	15	1	2	15	6	211	165	376	7.13
Cancer	...	...	1	...	...	...	...	...	1	...	1	0.02
Beri-Beri	...	...	1	...	...	...	...	...	1	...	1	0.02
Diseases of the heart	...	1	2	5	...	1	...	...	7	2	9	0.17
Heart Failure	...	...	2	1	...	1	...	...	2	2	4	0.08
Bronchitis	17	14	4	3	...	...	...	1	21	18	39	0.74
Pneumonia (all forms)	1	...	14	...	8	...	...	...	23	...	23	0.44
“Demam Batok”	19	18	3	2	...	...	2	1	24	22	46	0.87
Other diseases of Resp. System	8	7	2	1	...	...	...	...	10	8	18	0.34
Other diseases of digestive system	18	10	3	4	...	...	1	...	22	14	36	0.68
Convulsions	62	48	7	6	1	...	1	2	71	56	127	2.41
Diseases of nervous system and sense organs	...	...	2	...	...	...	...	1	2	1	3	0.06
Non-venereal diseases of Genito- urinary system	...	...	1	2	...	...	...	...	1	2	3	0.06
“Basal”	13	6	4	...	...	...	1	...	18	6	24	0.46
Diseases of pregnancy, child birth, etc.	...	...	10	...	2	...	1	...	...	13	13	0.25
Premature birth and diseases of early infancy	...	...	1	2	...	1	...	...	1	3	4	0.08
Old age or Senility	41	50	3	1	...	...	3	3	47	54	101	1.92
Violence (all forms, including accidents)	...	3	2	11	1	...	2	...	16	3	19	0.36
Other causes	...	...	14	7	11	3	2	...	27	10	37	0.70
TOTAL	...	393	332	129	44	16	7	27	565	400	965	18.31

Deaths according to Sex and Nationalities.

Nationality			Males		Females		Total	
Malays	...	...	393	332	332	332	725	725
Chinese	...	...	129	44	44	44	173	173
Indians	...	...	16	7	7	7	23	23
Siamese	...	...	27	17	17	17	44	44
Total	...	565	400	400	400	400	965	965

Deaths grouped according to Age, Sex and Nationalities, 1937.

Age Groups			Sex	Malays	Chinese	Indians	Siamese	Total
0	...	...	{ Males	35	6	...	1	42
			{ Females	17	5	1	1	24
4 weeks	...	...	{ Males	17	9	...	...	26
			{ Females	18	4	...	1	23
3 months	...	...	{ Males	16	4	...	...	20
			{ Females	14	3	...	1	18
6 "	...	...	{ Males	10	2	2	3	17
			{ Females	15	4	...	...	19
1 year	...	...	{ Males	47	10	2	4	63
			{ Females	35	4	2	2	43
5 years	...	...	{ Males	12	5	...	2	19
			{ Females	13	5	...	2	20
10 "	...	...	{ Males	8	1	...	...	9
			{ Females	6	2	...	...	8
15 "	...	...	{ Males	6	1	...	2	9
			{ Females	8	...	...	...	8
20 "	...	...	{ Males	9	4	1	...	14
			{ Females	5	...	1	...	6
25 "	...	...	{ Males	12	6	...	1	19
			{ Females	18	1	2	3	24
30 "	...	...	{ Males	28	9	...	...	37
			{ Females	17	1	1	...	19
35 "	...	...	{ Males	15	9	1	3	28
			{ Females	12	1	...	1	14
40 "	...	...	{ Males	22	11	1	...	34
			{ Females	9	6	...	1	16
45 "	...	...	{ Males	21	12	2	1	36
			{ Females	9	2	...	...	11
50 "	...	...	{ Males	17	16	6	2	41
			{ Females	16	1	...	2	19
55 "	...	...	{ Males	47	20	...	3	70
			{ Females	20	1	...	...	21
65 "	...	...	{ Males	28	3	...	5	36
			{ Females	38	3	...	2	43
75 years and above	...	...	{ Males	43	1	1	...	45
			{ Females	62	1	...	1	64
Total Males & Females ...				725	173	23	44	965

MATERNITY AND CHILD WELFARE.

During the year 13 deaths were recorded as due to affections connected with pregnancy and parturition, or a percentage of 0.68 to total births.

The number of still-births recorded was 105, or a percentage of 5.86 to total births.

37 cases under pregnancy, child—birth and their diseases were admitted into hospital.

Three fatal cases of tetanus neonatorum (all Chinese) were admitted into hospital from Kuala Perlis.

The first pupil midwife who was sent to Alor Star Hospital last year returned in August after a year's training and has been stationed at Kangar. The response of the *kampong* people to utilise the services of the *kampong* midwife is rather poor; but progress in this direction is bound to be slow.

The second pupil midwife to be trained as a *kampong* midwife was sent to Alor Star Hospital in September.

III. HOSPITALS AND DISPENSARIES.

GENERAL HOSPITAL, KANGAR.

The number of in-door cases treated during the year was 1,707, a slight increase over the number treated during the previous year (1,667).

There were 89 deaths, giving a percentage of 5.21 to total treated. Excluding 36 deaths which occurred within 48 hours of admission, the death rate was 3.17 per cent. The average duration of stay in hospital of fatal cases was 12.81 days.

The daily average number of inpatients was 59.20. The largest number of inpatients on any one day (May 25th) was 81.

In-door patients according to nationalities.

Nationality	No. treated	Deaths	Percentage of deaths	Deaths within 48 hours
Chinese	806	65	8.06	30
Indians	594	17	2.86	6
Malays	288	7	2.43	...
Javanese	1	...	...	...
Siamese	18	...	...	...
Total	1,707	89	5.21	36

There was an increase in the number of cases admitted for malaria, dysentery, venereal diseases, pulmonary tuberculosis and injuries; the number admitted for amoebic dysentery and ulcers was about the same, and there was a fall in the number of cases admitted for pneumonia, other lung complaints, ankylostomiasis and other diseases.

ADMISSIONS FROM ESTATES AND MINES.

The total number of patients from Estates and Mines was 176 with 12 deaths, or a percentage of 6.82.

Nationality	Remained	Admitted	Total	Deaths
Chinese	2	22	24	7
Indians	3	149	152	5
Total	5	171	176	12

PREVAILING DISEASES FOR THE LAST FIVE YEARS.

Diseases	1933		1934		1935		1936		1937		Details within 24 hours of Admission
	Deaths	Percentage									
Malaria	17	4.68	363	18	4.97	376	4	1.06	411	14	3.41
Dysentery amoebic	19	...	...	14	...	17	1	5.88	14	...	14
Dysentery, others	6	1	16.67	...	...	...	2	...	...	1	...
Venereal Diseases	62	...	...	48	1	2.08	35	...	50	1	2.00
Pulmonary tuberculosis	24	3	12.50	27	6	22.22	29	7	24.14	11	25.00
Pneumonia	5.5	19	34.55	73	43	58.90	68	40	58.82	62	2.9
Other lung complaints	119	5	4.20	78	5	6.41	96	8	8.33	99	10
Ankylostomiasis	47	5	10.64	87	4	4.60	61	3	4.92	96	5
Ulcers	58	...	...	53	...	...	56	...	57	...	54
Injuries	...	...	104	2	1.92	96	...	107	2	1.87	134
Other diseases	522	29	5.55	565	37	6.55	650	16	2.46	698	38
TOTAL	1,379	81	5.90	1,403	114	8.13	1,495	81	5.42	1,667	109
											89
											5.21
											21

Infectious Diseases with Deaths.

Diseases		Total treated	Deaths	Percentage of deaths
Cerebrospinal Fever	...	10	5	50·00
Chicken-pox	...	2	...	...
Diphtheria	...	2	1	50·00
Dysentery Amœbic	...	14	2	14·29
,, Other	...	15	1	6·67
Typhoid Fever	...	4	1	25·00
Paratyphoid Fever	...	1	...	...
Erysipelas	...	1	...	...
Hydrophobia	...	1	1	100·00 Died outside Hospital
Influenza	...	107	...	...
Leprosy	...	2	...	...
Measles	...	1	...	...
Pneumonia	...	44	15	34·09
Tetanus	...	4	4	100·00
Tuberculosis	...	61	11	18·03
Whooping Cough	...	1	...	...
Total	...	270	41	15·19

SURGICAL OPERATIONS.

3 Major Operations and 305 Minor Operations were performed.

LABORATORY WORK (vide also page 56).

Blood Films were examined in 4,872 instances with the following results:—

Malaria B. T. . .	..	..	..	..	..	982
,, M.T. . .	..	..	..	..	..	737
,, Quartan	..	..	..	..	..	5
,, Mixed	..	..	..	..	..	188
Negative . . .	..	..	..	..	..	2,960
					Total	.. 4,872

Other specimens examined totalled 3,333 (for details vide Appendix A on page 56).

POST MORTEM EXAMINATIONS.

Medico-legal	..	..	..	..	..	12
Pathological	..	..	..	..	..	10
					Total	.. 22

OUT-DOOR CASES.

				Kangar Hospital.	Out-door Dispensary, Kaki Bukit.
Number of New Cases	..	..	..	5,443	6,315
Repetitions	..	..	..	5,228	3,232

The patients who received treatment were of the following nationalities:—

Malays	..	..	..	3,286	769
Chinese	..	..	..	887	5,358
Indians	..	..	..	1,211	163
Siamese	..	..	..	26	22
Eurasians	..	..	..	2	..
Europeans	..	..	..	24	3
Others	..	..	..	7	..
				—	—
			Total	.. 5,443	6,315
				—	—

In addition to those treated at the dispensaries, 112 cases were treated in the Kangar Gaol.

The hospital midwife attended 4 cases of confinement in houses.

Neosalvarsan Injections numbered 1,513 of which 1,137 were for Yaws and 376 for other conditions.

Of the 810 new cases of Yaws that were treated during the year, only a few came up for subsequent injections.

624 patients took only one injection.

116 patients took only two injections.

59 patients took only three injections.

11 patients took only four injections.

The Travelling Dispensary attended to 411 cases, excluding those attended to at Schools, Police Stations, Public Works Department and Sanitary Board Ccoy Lines. The number of cases attended during 1936 was 1,579. The decrease in the number was due to the opening of the out-door dispensary at Kaki Bukit.

One mental case (male) was transferred to the Central Mental Hospital, Tanjong Rambutan, during the year; one was discharged cured and another was discharged and readmitted a few weeks afterwards; there were 19 Perlis patients (12 males and 7 females) in that institution at the end of 1937.

There were 4 Perlis Lepers—one at Pulau Jerejak Leper Settlement and three at Sungai Buloh, at the end of 1937.

APPENDIX—A.

LABORATORY WORK.

(Includes Return from Out-door Dispensary, Kaki Bukit).

Specimens		Positive	Negative	Total
Blood (Malaria) ...	...	1,912	2,960	4,872
Blood (Filaria) ...	...	1	2	3
Pus (Gonococci)	...	41	11	52
Eye Smear	...	7	11	18
Nasal Smear	...	...	8	8
Sputum (Tubercle Bacilli)	...	32	251	283
Stool	...	1,252	488	1,740
Urine	...	202	1,017	1,219
Cerebrospinal Fluid (Meningococci)	...	6	4	10
Total	...	3,453	4,752	8,205

APPENDIX B.

RETURN OF SICK PRISONERS ADMITTED INTO KANGAR HOSPITAL.

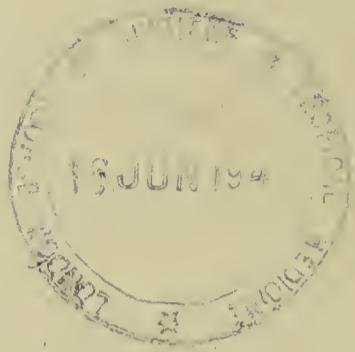
Diseases	Cases	Deaths
Influenza ...	13	...
Malaria, Malignant Tertian ...	2	...
,, Type not diagnosed ...	1	...
Pneumonia ...	2	...
Pyrexia of uncertain origin ...	1	...
Pulmonary Tuberculosis ...	2	...
Pre-tubercular condition ...	1	...
Yaws ...	1	...
Opium intoxication ...	2	...
Anæmia ...	1	...
Locomotor Ataxia ...	1	...
Mania ...	1	...
Asthma ...	4	...
Bronchitis ...	5	...
Gastritis ...	1	...
Colic, abdomen ...	1	...
Fistula in ano ...	1	...
Constipation ...	1	...
Orchitis ...	1	...
Abscess ...	3	...
Fibrositis ...	1	...
Boils ...	2	...
Ulcer ...	2	...
Scalds ...	1	...
Contusion ...	2	...
Wounds ...	3	...
Centipede bite ...	1	...
Ascariasis ...	1	...
Ankylostomiasis ...	3	...
Scabies ...	1	...
Malingering ...	1	...
Total ...	63	...

APPENDIX—C.
REPORT SHOWING THE NUMBER AND TYPE OF ANOPHELINE LARVAE COLLECTED IN PERLIS.

APPENDIX D.

REPORT SHOWING THE NUMBER AND TYPE OF
MOSQUITOES COLLECTED.

PLACES											REMARKS.	
	<i>A. vagus</i>	<i>A. barbirostris</i>	<i>A. hyrcanus</i> var. <i>nigerrimus</i>	<i>A. kochi</i>	<i>A. philippensis</i>	<i>A. leucosphyrus</i>	<i>A. maculatus</i>	<i>A. karvari</i>	<i>A. aconitus</i>	<i>A. umbrosus</i>	<i>A. subpictus</i>	<i>A. aitkeni</i>
Kangar	...	8	29	18	7	2	17	...	...	...	...	...
Arau	...	7	...	...	...	...	...	...	...	...	...	...
TOTAL	...	15	29	18	7	2	17	...	...	...	...	88.



APPENDIX E.
METEOROLOGICAL NOTES.

RAINFALL.

								Inches.
January	..	..	..	..	..	..	..	0.19
February	..	..	..	..	..	..	..	0.58
March	..	..	..	..	..	..	..	4.89
April	..	..	..	..	..	..	..	10.72
May	..	..	..	..	..	..	..	11.10
June	..	..	..	..	..	..	..	1.79
July	..	..	..	..	..	..	..	6.79
August	..	..	..	..	..	..	..	7.44
September	..	..	..	..	..	..	..	7.36
October	..	..	..	..	..	..	..	9.90
November	..	..	..	..	..	..	..	8.37
December	..	..	..	..	..	..	..	3.90
							Total	78.83

The maximum and minimum temperatures in the shade were 98° on 14th and 15th March and 62° on 5th January respectively.

Greatest rainfall in 24 hours was 6.07 inches on May 7th.



